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ABSTRACT

This issue includes the following articles: "Assimilation to the Unmarked" (Eric Bakovic); "On the Non-Universality of Functional Projections and the Effects on Parametrized Variation: Evidence from Creoles" (Marlyse Baptista); "What Turkish Acquisition Tells Us about Underlying Word Order and Scrambling" (Natalie Batman-Ratyosyan, Karin Stromswold); "Constituting Context: Null Objects in English Recipes Revisited" (Emily Bender); "Decomposing French Questions" (Cedric Boeckx); "A Conspiracy Argument for Optimality Theory: Emakhuwa Dialectology" (Farida Cassimjee, Charles W, Kisseberth); "Light-Headed Relatives" (Barbara Citko); "Semantically Charged Syntax and the Construction of Meaning" (Kristin M. Eide and Tor A. Afarli); "'Punctuality' and Verb Semantics" (Stefan Engelberg); "Acquisition of Default Inflectional Suffixes: Japanese Adjectives" (Miho Fujiwara); "Possessor Extraction in Child English: A Minimalist Account" (Elena Gavruseva, Rosalind Thornton); "The Long Distance Anaphora Conspiracy: The Case of Korean" (Kook-Hee Gill); "Topic, Focus, and the Grammar-Pragmatics Interface" (Jeanette K. Gundel); "Two Ways of Describing Distributive Readings" (J.R. Hayashishita); "The Reduplicative Nature of the Bulgarian Definite Article" (Ben Hermans); "The Origin of the Pre-Ossetic Oblique Case Suffix and Its Implications" (Ronald Kim); "A Hierarchy of Phonetic Constraints on Palatality in Russian" (Alexei Kochetov); "Japanese Floating Classifiers" (William McClure); "A-Scrambling Exists!" (Martha McGinnis); "Perception and Production of American English Tense and Lax Vowels by Japanese Speakers" (Michelle Minnick Fox, Kazuaki Maeda); "The Syntax of Adjunct Wh-NPs" (Masao Ochi, Tien-Hsin Hsin); "Reflexives and Constraints on the Borrowing of Discourse Function: Creoles and Tahitian French" (Kieran Snyder); and "Two Types of Verb Particle Constructions" (Mikael Vinka). References are appended to each article. (KFT)

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Volume 6.1 (1999)

Proceedings of the 23rd Annual Penn Linguistics Colloquium

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Assimilation to the Unmarked[*]

Eric Baković

1 Control and its Loss

Assimilation is often *controlled* by a segment in a particular position. For instance, vowel harmony is often *root-* or *stem-controlled*, meaning that the value of the harmonic feature in the root morpheme (more accurately, the stem of affixation) remains constant while the value of the feature in affixes alternates to agree with the root. Similarly, in voicing assimilation, the value of [voice] often remains constant in an onset while a coda alternates to agree with the onset; voicing assimilation is thus often *onset-controlled*.[1] An example of onset-controlled voicing assimilation comes from Yiddish (Katz 1987, Lombardi 1996). Final obstruents contrast in voicing, but adopt a following initial obstruent's value of the feature in compounds.

(1) Obstruent clusters in Yiddish (Katz 1987:29-30)

a. $[+\text{voice}]_{\text{Coda}}\ [-\text{voice}]_{\text{Onset}} \rightarrow [-\text{voice}]_{\text{Coda}}\ [-\text{voice}]_{\text{Onset}}$

[vɔ*g*]	'weight'	[vɔ*kʃ*ɔl]	'scale'
[bri*v*]	'letter'	[bri*ft*rɛgər]	'mailman'
[aj*z*]	'ice'	[aj*sk*astn]	'icebox'
[ʃanta*ʒ*]	'blackmail'	[ʃanta*ʃʃ*tik]	'blackmailing tactics'

b. $[-\text{voice}]_{\text{Coda}}\ [+\text{voice}]_{\text{Onset}} \rightarrow [+\text{voice}]_{\text{Coda}}\ [+\text{voice}]_{\text{Onset}}$

[ba*k*]	'cheek'	[ba*gb*ejn]	'cheekbone'
[bu*x*]	'book'	[bu*ɣg*əʃɛft]	'bookstore'
[zi*s*]	'sweet'	[zi*zv*arg]	'candy products'
[kɔ*p*]	'head'	[kɔ*bv*ejtik]	'headache'
[vaj*t*]	'far'	[vaj*dz*ɛəvdik]	'farsighted'

Lombardi (1996) proposes to account for onset-controlled voicing assimilation through the interaction among three types of constraints: faithfulness (McCarthy & Prince 1995, 1997), *onset-specific* faithfulness (Beckman 1998), and agreement (Lombardi's own proposal in these works; see also Butska 1998). Tokens of these constraint types that are relevant to obstruent voicing are defined in (2) below.

---

[*] This paper is a heavily edited version of Chapter 1 of my dissertation (Baković, forthcoming). I'd like to thank Akin Akinlabi, Ed Keer, Linda Lombardi, Ania Lubowicz, John McCarthy, Alan Prince, Hubert Truckenbrodt, and the audience at PLC 23 for useful comments and suggestions on this material. Errors are mine.

[1] The term 'onset' is used here as a shorthand for a consonant tautosyllabically released into a sonorant (see Lombardi 1991; cf. Steriade 1997).

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(2) Constraints
  a. IDENT[V] — An output obstruent and its input correspondent must have the same value of the feature [voice].
  b. ONS-IDENT[V] — An output onset obstruent and its input correspondent must have the same value of the feature [voice].
  c. AGREE[V] — Adjacent output obstruents must have the same value of the feature [voice].

AGREE[V] enforces voicing assimilation in obstruent clusters due to its rank above IDENT[V]; no matter where the onset-specific ONS-IDENT[V] is ranked with respect to these, it decides in favor of assimilation to the onset.

(3) Input: $[-\text{voice}]_{\text{Coda}}\ [+\text{voice}]_{\text{Onset}}$

Candidates		AGR[V]	ID[V]	ONS-ID[V]
a.	$[-\text{V}]_{\text{Coda}}\ [+\text{V}]_{\text{Onset}}$	* !		
b. ☞	$[+\text{V}]_{\text{Coda}}\ [+\text{V}]_{\text{Onset}}$		*	
c.	$[-\text{V}]_{\text{Coda}}\ [-\text{V}]_{\text{Onset}}$		*	* !

There are obstruent clusters, however, in which neither obstruent is an onset and thus to which ONS-IDENT[V] is technically inapplicable. Take, for instance, final clusters created by affixation of a suffix consisting of a single obstruent to an obstruent-final root. If either of the obstruents is underlyingly voiceless, the cluster surfaces as voiceless.[2]

(4) Final obstruent clusters in Yiddish (Katz 1987:127-131)
[+voice] [–voice] → [–voice] [–voice]

[zɔ*g*]	'say! (familiar)'	[zɔ*kt*]	'say! (formal)'

Since ONS-IDENT[V] is irrelevant in final clusters, it cannot be the constraint that breaks the tie between the two potential AGREE[V]-satisfying candidates. Lombardi attributes assimilation to voicelessness to a markedness constraint against voiced obstruents, *[+V].[3] This is depicted in (5).

---

[2] There are no examples in Yiddish of a voiced obstruent suffix. Lombardi (1996:28) claims that this gap is "more or less expected" because "such suffixes would always devoice" — but this is clearly not the case. Such a suffix is expected to devoice only when attached to a root with a final voiceless obstruent, but since word-final voicing is otherwise contrastive in Yiddish (see (1)), it is otherwise expected to faithfully surface voiced. (There also seem to be no examples of final voiced clusters, polymorphemic or otherwise, but Lombardi provides one from Serbo-Croatian, which is parallel to Yiddish: [gro*zd*] 'bunch of grapes'.)

[3] Lombardi's constraint is called '*Lar', amounting to the same thing here.

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(5) Input: [+voice] [−voice]

Candidates		AGR[V]	ID[V]	ONS-ID[V]	*[+V]
a.	[−V] [+V]	* !			*
b.	[+V] [+V]		*		* ! *
c. ☞	[−V] [−V]		*		

*[+V] cannot be ranked just anywhere; it must be crucially ranked with respect to both of the faithfulness constraints. For example, ONS-IDENT[V] must dominate *[+V] to account for assimilation of a voiceless coda to a voiced onset, as shown in (6) (cf. (3)).

(6) Input: [−voice]$_{Coda}$ [+voice]$_{Onset}$

Candidates		AGR[V]	ID[V]	ONS-ID[V]	*[+V]
a.	[−V]$_{Coda}$ [+V]$_{Onset}$	* !			*
b. ☞	[+V]$_{Coda}$ [+V]$_{Onset}$		*		**
c.	[−V]$_{Coda}$ [−V]$_{Onset}$		*	* !	

IO-IDENT[V] must also dominate *[+V] in order to account for the fact that single voiced obstruents (i.e., not in clusters) are generally contrastive, as shown in (7). (The fact that ONS-IDENT[V] dominates *[+V] is not sufficient to account for this fact, since the voicing contrast obtains in word-final codas as well as in onsets. The potentially extraneous violation of ONS-IDENT[V] is therefore indicated in the tableau by a parenthesized asterisk.)

(7) Input: [+voice]

Candidates		AGR[V]	ID[V]	ONS-ID[V]	*[+V]
a. ☞	[+V]				*
b.	[−V]		* !	(*)	

The significant insight behind this proposal is that it is *markedness* that decides between two AGREE[V]-satisfying candidates when onset-specific faithfulness is not at stake. This makes the interesting prediction that all else being equal, there will be *assimilation to the unmarked*; to wit, in the case of Yiddish, assimilation to voicelessness. This seems to be the correct result in general: there are apparently no languages in which there is assimilation to the marked value [+V] when onset-specific faithfulness is irrelevant.

Nevertheless, the ranking in (7) predicts that in a string of three or more obstruents in final position (that is, when ONS-IDENT[V] is irrelevant) what will emerge will not depend on markedness, but rather on the *relative percentages* of [+voice] and [−voice] in the input. Take an input with three

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final obstruents, as in (8), two of which are voiced (the first two here, but this detail is technically irrelevant). A faithful rendition of this input fatally violates AGREE[V], as shown by (8a); the two remaining candidates are left to be compared by IDENT[V], which prefers one change from [–voice] [+voice] (8b) rather than two changes from [+voice] to [–voice] (8c).

(8) Input: [+voice] [+voice] [–voice]

Candidates		AGR[V]	ID[V]	ONS-ID[V]	*[+V]
a.	[+V] [+V] [–V]	* !			**
b. ☞	[+V] [+V] [+V]		*		***
c. ☠	[–V] [–V] [–V]		** !		

As Lombardi (1996) notes, no phonological process is known to work in this way, caring one way or the other about the relative percentages of feature values in the input — a pathological situation I refer to as 'majority rule.' Lombardi proposes to avoid the erroneous majority rule prediction by redefining featural faithfulness constraints. Any such redefinition has consequences beyond the case at hand, of course, and in §2 immediately below I review two potential candidates for the redefinition of featural faithfulness constraints and reject them based on their respective adverse consequences. In §3 after that, I offer my own proposal, the local conjunction (Smolensky 1993, 1995, 1997) of markedness and faithfulness (Lubowicz 1998).

2 Two Faithfulness Makeovers

2.1 Forcing the tie

The logic of Lombardi's own proposal runs as follows: it is the lack of a tie on IDENT[V] that yields the wrong result in (8); therefore, this constraint — or, more generally, all featural faithfulness constraints — must be redefined such that there *is* a tie in this case. Lombardi proposes that IDENT[V] should be redefined in such a way that any number of changes in voicing receive a grand total of exactly one violation of IDENT[V]. The result, as desired, is for the candidate comparison in (8) to be corrected as shown in (9).

(9) Input: [+voice] [+voice] [–voice]

Candidates		AGR[V]	IO-ID[V]	ONS-ID[V]	*[+V]
a.	[+V] [+V] [–V]	* !			**
b.	[+V] [+V] [+V]		*		* ! **
c. ☞	[–V] [–V] [–V]		*		

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The intended result in this particular case is clear, but the details of the proposal are left largely unaddressed by Lombardi, and there is at least one unintended consequence that must be addressed. If it really is the case that IDENT[V] is violated exactly once by any number of changes in voicing, then a bizarre situation is predicted. Recall that in Yiddish, there is voicing assimilation in clusters but a voicing contrast otherwise. The basic contrast is due to the ranking of IDENT[V] over *[+V], which allows both voiced and voiceless obstruents to surface faithfully, and the assimilation in clusters is due to the ranking of AGREE[V] over IDENT[V] (putting aside the onset/coda asymmetry). This much has already been established. Now consider a form with *both* a cluster and a single obstruent. The outcome should be assimilation in the cluster and an independent contrast in the single obstruent. But this is not necessarily the result under Lombardi's proposal when taken at face value. Since any number of changes in voicing receive only one violation of IDENT[V], what is predicted is assimilation in the cluster and neutralization to voicelessness in the single obstruent, as shown in (10).[4]

(10) Input: [+voice]⁀[–voice], [+voice]

Candidates		AGREE[V]	IDENT[V]	*[+V]
a.	[+V]⁀[–V], [+V]	* !	▨	**
b. ☠	[–V]⁀[–V], [+V]		*	* !
c. ☞	[–V]⁀[–V], [–V]		*	

A faithful rendition of the cluster fatally violates AGREE[V], as shown by the candidate in (10a); one member of the cluster must assimilate to the other. Given this, there are two relevant candidates left to consider: what should be the actual Yiddish output in (10b), in which the single obstruent remains voiced, and the output in (10c), in which the single obstruent is devoiced. Both of these latter two candidates involve a change in voicing; the first involves one change (assimilation), the second involves two (assimilation and devoicing). Taking Lombardi's proposal literally, this integral distinction is as irrelevant in this case as it needs to be in (9); therefore, (10c) is expected to win, contrary to fact. What's really going wrong here is that the voicing contrast of the single obstruent should not depend at all on whether there is a cluster elsewhere in the form, but it does. Unless Lombardi's proposal can somehow be purged of this unintended consequence while retaining the desired result in (9), it must be rejected for this reason.

---

[4] The input considered in this tableau represents a form with a voiced-voiceless cluster (linked by a tie bar) and a single voiced obstruent (separated by a comma). To put aside the onset/coda asymmetry, only candidates that satisfy ONS-IDENT[V] are considered; this means that the single obstruent must be word-final.

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2.2 Feature value faithfulness

In the context of the proposal just reviewed, Lombardi (1996) alludes to so-called MAX[*f*] constraints, on which see Lombardi 1995, 1998, Causley 1997, and Walker 1997, among others.[5] In the Correspondence theory of faithfulness, MAX is a constraint that requires input elements to have output correspondents; MAX[V] would thus be a constraint that requires an underlying instance of [voice] to be preserved in the output. Various refinements of this basic idea have been proposed in the literature, and each of them is partly designed to get around the fact that an underlying instance of [α*f*] can technically be in correspondence with an output instance of [–α*f*], because imperfect correspondence is still correspondence.[6]

It seems then that MAX[*f*] constraints must somehow require *feature value identity*, not just featural preservation. One way to achieve this is to assume that (some) features are privative, such that binary distinctions like "voiced" vs. "voiceless" are captured by the presence vs. absence, respectively, of some monovalent feature [voice] (see Lombardi 1991, 1995 and references therein on the privativity of [voice]). Thus, MAX[V] would require preservation of voicing, while the counterpart constraint DEP[V] would require preservation of voicelessness by penalizing output instances of [voice] with no underlying correspondents.

This is the second candidate for the redefinition of featural faithfulness constraints to consider: one which distinguishes between, e.g., voiced-to-voiceless and voiceless-to-voiced input-output mappings. To avoid various technical problems with the specifics of the MAX[*f*]/DEP[*f*] approach (for instance, the fact that additional constraints are needed to prevent features from freely floating around, on which see Itô, Mester, & Padgett 1995, Myers 1997, among others), I consider instead the proposal found in Pater 1995, McCarthy & Prince 1995, 1997, and Butska 1998, among others — equivalent in presently relevant respects to the MAX[*f*]/DEP[*f*] approach — in which the featural faithfulness constraints that have so far become familar here are redefined as follows (cf. (2a)).

(11) Feature value faithfulness
  a. IDENT[+V] — If an output obstruent is [+voice], then its input correspondent in the output is also [+voice].
  b. IDENT[–V] — If an output obstruent is [–voice], then its input correspondent in the output is also [–voice].

---

[5] See also Kirchner 1993, Myers 1994, Itô, Mester, & Padgett 1995, and many others on the analogous PARSE[*f*] constraints of pre-Correspondence OT.

[6] See Baković 1999 and references therein on imperfect correspondence.

The majority rule problem is avoided under this proposal by taking the symmetry out of featural faithfulness. When onset-specific faithfulness is not at stake, the 'trigger' of assimilation is determined by the relative ranking of IDENT[+V] and IDENT[–V]. If IDENT[+V] dominates IDENT[–V], then it is preferable to maintain any underlying [+voice] specifications on the surface, regardless of how many [–voice] specifications need to be changed in order to ensure agreement. If IDENT[–V] dominates IDENT[+V], on the other hand, it is preferable to maintain any [–voice] specifications and any number of [+voice] specifications may be sacrificed in order to achieve assimilation.

This is shown in (12). The input considered here is the same as the one considered in (9), with two voiced obstruents and a voiceless one. The faithful candidate in (12a) violates undominated AGREE[V] and is thus ruled out. This leaves the usual two assimilated candidates, (12b) and (12c), the former being the majority rule, assimilation-to-the-marked candidate and the latter being the desired assimiliation-to-the-unmarked candidate. The former correctly loses to the latter, due to the former's single but fatal violation of higher-ranked IDENT[–V] compared to the latter's double but irrelevant violation of lower-ranked IDENT[+V].

(12) Input: [+voice] [+voice] [–voice]

Candidates		AGR[V]	ID[–V]	ID[+V]	*[+V]
a.	[+V] [+V] [–V]	* !			**
b.	[+V] [+V] [+V]		* !		***
c. ☞	[–V] [–V] [–V]			**	

This is the correct result, but it is bought at a serious price. As mentioned earlier, the fundamental insight behind Lombardi's analysis is that when onset-specific faithfulness is not at stake, there is predicted to be assimilation to the unmarked. This prediction can at best only be stipulated assuming feature value faithfulness. For instance, in this particular case it must be stipulated that IDENT[–V] universally dominates IDENT[+V] in order to avoid generating an unattested language in which there is assimilation to the marked [+voice] when onset-specific faithfulness is irrelevant. Such a universal ranking statement would in effect duplicate the independently necessary role of markedness, with significant explanatory loss.

3 Local conjunction

My own proposed solution to the apparent problem of 'majority rule' is to recognize the *local conjunction* (Smolensky 1993, 1995, 1997) of markedness and faithfulness constraints (Lubowicz 1998). Like the feature value faithfulness approach (§2.2), the result of this solution to the problem is that

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the choice between the two possible candidates that survive AGREE[V] never actually falls to the problematically symmetrical IDENT[V]. Like the forced tie approach (§2.1), the local conjunction solution correctly predicts assimilation to the unmarked in the absence of onset-specific faithfulness considerations. The proposed solution thus incorporates all of the benefits and none of the drawbacks of the other two solutions.

Smolensky (1993, 1995, 1997) proposes that besides the constraint domination relation '»', there exists another relation that may hold between the constraints of Universal Grammar: the local conjunction relation '$\&_l$'. Two constraints A and B may be locally conjoined, creating a third constraint A $\&_l$ B that is violated whenever both A and B are simultaneously violated in some local domain *l*. Local conjunctions are in general motivated by situations in which it appears that A and B are individually violable in order to satisfy some conflicting constraint C, but when satisfaction of *both* A and B within some local domain is at stake, C is forced to be violated instead. Such an interaction of constraints is simply not possible under strict domination; if C dominates A and B, then either A or B or both are violated as many times as necessary to satisfy C. In order for the coincidental violation of both A and B to 'gang up' on C, a local conjunction A $\&_l$ B that in turn outranks C is necessary.

The elements of the theory of local conjunction that I assume are as follows (adapted from Itô & Mester 1998:11). Note in particular the universal ranking that is assumed to hold between local conjunctions and their conjuncts, stated in (13c), to the effect that it is universally worse to violate a local conjunction than it is to violate either of its conjuncts. This component of the theory plays a crucial part in my proposal, as I make clear below.

(13) Local conjunction
  a. Definition: Let A and B be members of the constraint set *Con*. Then their local conjunction A $\&_l$ B is also a member of *Con*.
  b. Interpretation: The local conjunction A $\&_l$ B is violated if and only if both its conjuncts A and B are violated in the smallest domain evaluable by A and B.
  c. Ranking (universal): A $\&_l$ B » { A, B }

I follow Lubowicz (1998) in assuming that the local domain *l* of a local conjunction is always the smallest domain evaluable by its conjuncts, as noted in (13b). This restriction prevents some of the potential proliferation of local conjunctions, because two local conjunctions cannot differ solely by their domain of application.[7] It also appears to render ineffectual the local conjunction of a constraint with itself ('local self-conjunction'; see Smolensky 1995, Alderete 1997, Itô & Mester 1996, 1998, Spaelti 1997), because the effect of A $\&_l$ A would be the same as the effect of A alone.

---

[7] A considerable amount of attention is paid in the literature on local conjunction to the question whether any two constraints are conjoinable (see e.g. Miglio &

Various types of constraints may be locally conjoined. For instance, Kirchner (1996) argues that the proper analysis of synchronic chain shifts involves the local conjunction of faithfulness constraints, Itô & Mester (1998) show how positional markedness effects can be analyzed with the local conjunction of markedness constraints, and Lubowicz (1998) proposes to account for derived environment effects with the local conjunction of markedness and faithfulness. I specifically adopt Lubowicz's proposal here, and assume local conjunctions of the form in (14).

(14) *[+V] $\&_l$ IDENT[V] — An output segment must not be specified as [+V] if its input correspondent is not also specified as [+V].

Note that the conjuncts of the local conjunction in (14) are *relevant* to each other in the sense that each conjunct mentions a particular feature also mentioned by the other conjunct. I refer to such local conjunctions as *co-relevant*.[8] The net effect of a co-relevant local conjunction of markedness and faithfulness is to specifically prohibit the unfaithful introduction of a marked segment. *[+V] $\&_l$ IDENT[V] is not violated by just any [+voice] obstruent in the output; it is violated only if such an output obstruent is in correspondence with a [–voice] obstruent in the input — in other words, only if the output vowel is *unfaithfully* [+voice]; only if it is [+voice] *by virtue of its unfaithfulness* to the input value of [voice]. (I return to the importance of the concept of co-relevance futher below.)

*[+V] $\&_l$ IDENT[V] is almost exactly the same as the feature value faithfulness constraint IDENT[–V]: both are violated by a voiced obstruent in the output that is in correspondence with a voiceless obstruent in the input. The important difference between them is that *[+V] $\&_l$ IDENT[V] is universally higher-ranked than each of its conjuncts *[+V] and IDENT[V], according to the universal ranking element (13c) of the theory of local conjunction. Therefore, the asymmetrical local conjunction *[+V] $\&_l$ IDENT[V] will always get evaluative priority over its symmetrical faithfulness conjunct IDENT[V], eliminating the majority rule problem.

This is shown in (15), where the input is the same as the one considered in (9) and (12), with two voiced obstruents and a voiceless one. The faithful

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Fukazawa 1997, Itô & Mester 1998, and Lubowicz 1998). The concensus seems to be that *not* any two constraints should be conjoinable, and there are thus various proposals for properly restricting the somewhat broad definition in (13a).

[8] I thank Ed Keer, Ania Lubowicz, and Alan Prince for discussion, both direct and indirect, of the significance of the concept of co-relevance defined here.

candidate in (15a) is, as usual, ruled out by its fatal violation of AGREE[V]. The majority rule, assimilation-to-the-marked candidate in (15b) correctly loses to the desired assimiliation-to-the-unmarked candidate in (15c), because the former fatally violates the universally higher-ranked local conjunction *[+V] &$_l$ IDENT[V] while the latter only violates the (in this case irrelevantly) lower-ranked symmetrical faithfulness conjunct IDENT[V].

(15) Input: [+voice] [+voice] [–voice]

Candidates	AGR[V]	*[+V] &$_l$ ID[V]	ID[V]	*[+V]
a. [+V] [+V] [–V]	* !			**
b. [+V] [+V] [+V]		* !	*	***
c. ☞ [–V] [–V] [–V]			**	

This local conjunction solution to the majority rule problem supports and reflects Lombardi's insight that markedness wins the day when onset-specific faithfulness is not at stake; i.e., that there is assimilation to the unmarked, regardless of the relative percentages of marked and unmarked values of [voice] in the input. Still, there is a residual issue left to be addressed.

Itô & Mester (1998:§2.2) argue against the local conjunction of markedness and faithfulness constraints. As these authors show, there are some undesirable consequences that result when certain markedness and faithfulness constraints are locally conjoined with each other. For instance, the local conjunction of the markedness constraint NOCODA (violated by closed syllables) and the faithfulness constraint IDENT[V], ranked with respect to other constraints as in (16), can generate a language in which obstruents may be voiced *only in the coda of a syllable*, the reverse of what is typically found.

(16) Syllable-initial devoicing? (Itô & Mester 1998:14-15)
NOCODA &$_l$ IDENT[V] » *[+V] » IDENT[V]

The argument proceeds as follows. Voiced obstruents are in general devoiced due to the ranking of *[+V] over IDENT[V] — except in codas, because codas violate NOCODA and therefore devoicing (more generally, any change in voicing) in the coda violates the top-ranked local conjunction NOCODA &$_l$ IDENT[V]. The result is a voicing contrast only in the coda or, more or less equivalently, voicing neutralization only in the onset.[9]

As Alan Prince and Ania Lubowicz (p.c.) have pointed out to me, the problem with local conjunctions like Itô & Mester's NOCODA &$_l$ IDENT[V] is that its conjuncts are not co-relevant, in the specific sense defined earlier

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[9] This argument presupposes that codas aren't otherwise dealt with in the language by, e.g., deletion or epenthesis; see Itô & Mester 1998 for these details.

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(§3.2). Violation of the faithfulness conjunct — in this case, IDENT[V] — does not aid and abet in the violation of the markedness conjunct NOCODA. In other words, simply removing the relevant IDENT[V] violation from a candidate that violates NOCODA $\&_l$ IDENT[V] does not thereby result in the satisfaction of NOCODA; a coda remains, whether it's voiced or voiceless.

The conjuncts of *[+V] $\&_l$ IDENT[V], on the other hand, *are* co-relevant. Removing the relevant IDENT[V] violation from a candidate that violates *[+V] $\&_l$ IDENT[V], for example, guarantees the satisfaction of *[+V] since the result is a [−voice] obstruent. The faithfulness violation is in a sense *responsible* for the markedness violation in the case of *[+V] $\&_l$ IDENT[V], but not in the case of local conjunctions like NOCODA $\&_l$ IDENT[V].[10] The local conjunction relation must thus be defined such that a local conjunction of markedness and faithfulness is necessarily co-relevant.

4 Dominance

As has been noted throughout this paper, assimilation to the unmarked in the case of voicing assimilation results when onset-specific faithfulness is irrelevant. One might ask whether this is a fact about voicing assimilation alone; I suspect that it is not, and that there is assimilation to the unmarked whenever positional considerations of particular assimilation processes are rendered irrelevant due to one reason or another. Unfortunately, this is not easy to test, as may have been noted in the case of voicing assimilation itself: in order to garner any evidence from actual alternations, a language must at least have obstruent-final stems, suffixes consisting of nothing other than an obstruent (or obstruents), and the ability to tolerate the resulting tautosyllabic obstruent cluster — each a taller order than the last. Indeed, even when such a language is in evidence, as in the case of Yiddish, there are insufficient data to truly see the full range of possibilities. I have no doubt that Lombardi is right in her suspicion that no language could have the equivalent of 'majority rule,' but it would seem that this is not really possible to know for sure.

Other assimilation processes do not seem to offer any solace. In the case of vowel harmony, for instance, positional considerations could never be rendered irrelevant. There is always a root, and root-specific faithfulness (or whatever is responsible for root/stem control; see Baković, forthcoming) will always be there to select the position-controlled candidate. Or will it? This is OT, after all, and constraints are ranked and violable. If the relevant positional constraint is low-enough ranked, it is almost as good as rendering it irrelevant. I claim that what is known as *dominant-recessive* vowel harmony is an instance of precisely this result.[11]

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[10] The conjuncts of the local conjunctions invoked by Lubowicz (1998) to account for phonologically-derived environment effects are unproblematically co-relevant, but those of the ones invoked to account for *morphologically*-derived environment effects are not. This discrepancy is not addressed here; see Burzio 1998 for an alternative approach to both types of derived environment effects.

Root- or stem-controlled vowel harmony systems are by far the better-known examples of vowel harmony. In such systems, the harmonic feature value of a word is systematically determined by a vowel in the stem of affixation. In the less well-known examples of dominant-recessive vowel harmony systems, the harmonic feature value of a word seems to be determined not by a particular morpheme or class of morphemes but rather by the underlying presence in any morpheme of a vowel with a particular value of the harmonic feature. Thus, in a dominant-recessive vowel harmony system, vowels in the root/stem may in some cases change to agree with an affix vowel.

For instance, in Kalenjin (Hall et al. 1974, Halle & Vergnaud 1981, Ringen 1988), words generally consist exclusively of [+ATR] vowels or of [–ATR] vowels. The presence of a [+ATR] vowel anywhere in the word requires all other vowels in the word to be [+ATR]; otherwise, all vowels surface with their underlying value of [–ATR]. The example in (17a) is a word with all [–ATR] vowels underlyingly, and it surfaces as such. The example in (17b) replaces the [–ATR] root /kɛr/ 'shut' with the [+ATR] root /keːr/ 'see', causing all the other vowels in the word to shift to [+ATR]. The same is shown in (17c); here, it is the [+ATR] noncompletive suffix /e/ that causes the shift of all vowels to [+ATR], including the root vowel.[12] Note the fact that as many [–ATR] vowels as necessary are changed to agree with a single [+ATR] vowel (17b,c), despite the fact that [–ATR] is otherwise contrastive (17a); that is, there is no clearly no majority rule.

(17) Kalenjin [ATR] harmony (adapted from Hall et al. 1974:247)
a. /kɪ̠ • ɑ̠ • √kɛ̠r / → kɪ̠ɑ̠gɛ̠r
DIST. PAST • 1SG • shut 'I shut it'
b. /kɪ̠ • ɑ̠ • √ke̟ːr • ɪ̠n / → ki̟ɐ̟ge̟ːri̟n
DIST. PAST • 1SG • see • 2SG 'I saw you (sg.)'
c. /kɪ̠ • ɑ̠ • √kɛ̠r • e̟ / → ki̟ɐ̟ge̟re̟
DIST. PAST • 1SG • shut • NONCOMPL. 'I was shutting it'

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[11] Lombardi (1996) analyzes 'bidirectional devoicing' in Swedish (Hellberg 1974) in just this manner. Coda obstruents do not necessarily agree with following onset obstruents in Swedish; if either the coda or the onset is voiceless underlyingly, an obstruent cluster surfaces voiceless. Thus, *hö[g]* 'high' but *hö[kt]id* 'festival', with assimilation to the onset in voicelessness, and *[d]ag* 'day' but *ti[st]ag* 'Tuesday', with assimilation to the coda in voicelessness.

[12] A bullet '•' denotes a morpheme boundary and the radical symbol '√' denotes that the following morpheme is the root. The diacritics under the vowel symbols indicate their respective [ATR] values for ease of reference.

I claim that the dominant-recessive harmony pattern of Kalenjin is a consequence of the low rank of the constraint usually responsible for root/stem control. The pertinent agreement constraint, AGREE[A], together with an appropriate local conjunction of markedness and faithfulness, conspire to always prefer the candidate with assimilation to the unmarked when assimilation is necessary (that is, when the vowels of a word underlyingly disagree in terms of [ATR]; otherwise, faithfulness to both values of [ATR] prevails.)

For this to work for Kalenjin and for the many other languages where [+ATR] is the 'dominant' harmonic feature value,[13] the 'recessive' harmonic feature value [–ATR] must be the marked one, yielding *[–A] $\&_l$ IDENT[A] as the appropriate local conjunction. Given a choice between assimilation to [+ATR] and assimilation to [–ATR], the local conjunction prefers the former.

This is shown by the tableau in (18) for a simple bimorphemic case with a [–ATR] recessive root and a [+ATR] dominant suffix. The faithful realization of this input, shown in (18a), is summarily disposed of by undominated AGREE[A]. The candidate in (18b), with assimilation to the marked [–ATR] value of the stem, is ruled out by the local conjunction, *[–A] $\&_l$ IDENT[A]. This leaves the candidate in (18c), with assimilation to the unmarked, as the winner — despite its lack of control.

(18) Input: √[–ATR] • [+ATR]

Candidates		AGR[A]	*[–A] $\&_l$ ID[A]	ID[A]
a.	√[–A] • [+A]	*!		
b.	√[–A] • [–A]		*!	*
c. ☞	√[+A] • [+A]			*

This ranking thus properly defines a dominant-recessive harmony system like Kalenjin, in which all vowels in a word assimilate to any vowel of the word that bears the dominant — understood here as unmarked — value of the harmonic feature. It is important to note in this context that I am not necessarily making a claim about the markedness of the values of the feature [ATR] in isolation. As is well known and understood (see in particular Archangeli & Pulleyblank 1994:172*ff*), the values of [ATR] are typically marked or unmarked *in combination* with particular values of other features. For instance, non-high [+ATR] and non-low [−ATR] vowels tend to be marked by virtue of the combination of articulatorily antagonistic feature values. As Hall & Hall (1980:207) note: "as the tongue root is moved forward [i.e., in the implementation of [+ATR] — EB], the tongue body is compressed and therefore raised. Conversely, as the tongue root is retracted [i.e., in the implementation of [−ATR] — EB], the tongue body is pulled down and therefore lowered."[14]

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[13] I thank the respondents to an electronic query I posted on the Optimal List and the LINGUIST List (Summary: Issue 9.776.1) — Roderic Casali in particular — for their help in cataloging a representative set of examples of dominant-recessive harmony systems. The typological fact that these all seem to involve [ATR] rather than other vowel features is to my knowledge not explained, nor explainable, by any theory of assimilation. I will not make any vain attempts to make sense of this fact here; this is of course not to say that it is not worthy of attention.

The constraint responsible for the dominance of [+ATR] vowels thus may not be *[−A] $\&_l$ IDENT[A], with a markedness conjunct violated by all [−ATR] vowels, but rather something more like *[−L,−A] $\&_l$ IDENT[A], with a multiple-feature markedness conjunct violated only by antagonistically-specified [−LO, −ATR] vowels. The empirical impact of this choice is subtle but significant: *[−L,−A] is not violated by a [+LO, −ATR] vowel, meaning that the local conjunction *[−L,−A] $\&_l$ IDENT[A] is not violated by a change from a [+LO, +ATR] vowel [ɐ] to a [+LO, −ATR] vowel [ɑ]. The result is that a [+LO, +ATR] vowel is predicted never to be dominant, as shown in (19).

(19) Input: √[−ATR] • [+LO, +ATR]

Candidates		AGR[A]	*[−L,−A] $\&_l$ ID[A]	ID[A]
a.	√[−A] • [+L,+A]	* !		
b. ☞	√[−A] • [+L,−A]			*
c.	√[+A] • [+L,+A]			*

As it happens, many if not most of the languages with dominant-recessive harmony have no [+LO, +ATR] vowel in their inventory, making this distinction irrelevant in those cases. Kalenjin *does* have [+LO, +ATR] vowels, but only as a result of assimilation to a [+ATR] (dominant) vowel; in other words, it is a fact of Kalenjin that there are no dominant low vowels. I take this fact to be significantly non-accidental and therefore propose that the relevant local conjunction is indeed *[−L,−A] $\&_l$ IDENT[A].

5 Summary

In this paper I explain how an apparent problem arises when one considers input forms with uneven ratios of the values of an assimilatory feature. If the usual positional considerations of assimilation are irrelevant, then an effect dubbed 'majority rule' emerges. Majority rule is a pathological consequence of the vertical symmetry of input-output faithfulness whereby an arbitrarily better-represented feature value overrules the other value, resulting in assimilation of the latter to the former rather than vice-versa. I propose to circumvent the majority rule effect by invoking the local conjunction of co-relevant markedness and faithfulness constraints. A local conjunction of this type is asymmetrically violated by a mapping from an unmarked feature value to a marked one, and is universally ranked above its conjuncts — its faithfulness conjunct in particular — thereby heading off the apparent problem induced by the symmetry of faithfulness. This solution yields the successful description of an attested pattern, assimilation to the unmarked, which is furthermore claimed to correspond to the pattern of dominant-recessive vowel harmony.

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[14] This passage is also cited by Archangeli & Pulleyblank (1994:175).

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On the Non-Universality of Functional Projections and the Effects on Parametrized Variation: Evidence from Creoles

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1 Introduction

In this paper, I address three crucial issues in the realm of universals and parametrized variation: Are functional projections universal? If they are not (as Iatridou (1990), Ouhalla (1991) and Speas (1991) first proposed), how do natural languages such as Creoles develop them? Finally, if a set of Creoles develop inflection (such as Tense inflection), what are the syntactic effects and can parametrized variation be predicted between the Creoles with inflectional verbal morphology (Capeverdean Creole & Lousiana Creole for instance) and those without?

Chomsky (1993) attempted to reduce parametric variations (such as overt V-raising or lack thereof) to morphological properties. In this sense, his approach is compatible with that of Pollock (1989), Vikner (1995), Rohrbacher (1993), and Roberts (1993). Furthermore, he assumed that LF is irrelevant in detecting variations in languages, as distinct properties may be detected only at PF. In other words, if parametric differences among languages such as raised phrases or phrases in-situ are not detectable at LF, one has to rely on morphological properties that are reflected at PF. So, languages with V-raising, like French, and those without V-raising, like English, are not distinguishable at LF. From the perspective of learnability, the child has to rely on the detectable properties at PF (morphological properties) to set the parameters of a given language correctly.

On this issue, this paper will demonstrate how in the process of developing inflectional morphology and functional projections, Creoles instantiate specific morpho-syntactic constraints which shed a new light on crucial typological distinction: Creoles which develop inflection, develop V-raising, whereas Creoles without tense inflection do not display verb movement. The examination of V-features or V properties in Creoles will lead to new conclusions in terms of their verbal categorization. Furthermore, we may say that there is a clear split between Creole languages with regard to V-raising, as this correlates with other properties that have been taken to indicate the Split Infl Parameter, following Bobaljik and Thráinsson (1998) (henceforth, B&T). More precisely, I will argue that some Creoles are set with the Split Infl Parameter (as they give evidence of additional Spec positions), whereas others are not.

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Additionally, while syntacticians have been mostly preoccupied with the syntactic effects of the loss of verbal morphology (as with the English language), the reverse focus of this paper is to examine what happens when languages such as Creoles develop Tense inflection.

This paper is divided into 5 sections: In the first section, I will introduce the underlying theoretical assumptions upon which this paper is based, following Iatridou (1990), Ouhalla (1991) and B&T (1998). In the second section, I will summarize Baptista (to appear) and will contrast Creole languages including Capeverdean, Guinea-Bissau Creole, Haitian, Chinook Jargon and Louisiana Creole. In the third part, I will show the points where my analysis joins and also contributes additional stipulations to B&T (1998) in the light of the behavior of Creole languages. In the fourth section, I will provide additional evidence for the existence of more specifier positions in the clausal architecture of some Creoles. Finally, in the fifth section, I will provide concluding remarks regarding the proposed theoretical analysis.

2 Theoretical Assumptions

In this section, I present the theoretical assumptions from three different sources upon which my analysis is based.

2.1 Iatridou (1990)

Iatridou (1990) is among the first scholars to challenge the belief that the data from one language in favor of a functional projection are sufficient to justify postulating the existence of the same functional categories in all languages. In other words, she questioned the universality of functional categories. She proposed instead that languages vary with respect to the functional categories they instantiate, and that evidence for the existence of specific functional categories will have to be found in each language separately.[1] This basic tenet will be at the core of the analysis we propose in this paper.

2.2 Ouhalla (1991)

Ouhalla's theory of parametrization assumed that parameters are associated with individual lexical items as part of the information specified in their lexical entries and that the set of lexical items with which parameters are associated is in fact restricted to the class of inflectional, meaning functional categories. Within this framework, we will argue in this paper that Creoles with verbal inflection project extra functional categories accounting for specific word orders and syntactic constructions that are not found in Creoles without verbal inflection. In this respect, Ouhalla (1990: 8) argues that functional categories have idiosyncratic properties which differ from one language to another, and that crucially the selectional properties of functional categories differ along typological lines. In this paper, we will try to corroborate Ouhalla (1990:17) and Baker (1988) by demonstrating that the presence of an affixal category in a given construction triggers movement processes which rearrange the order of constituents and that such movement processes do not apply in languages endowed with non-affixal categories.

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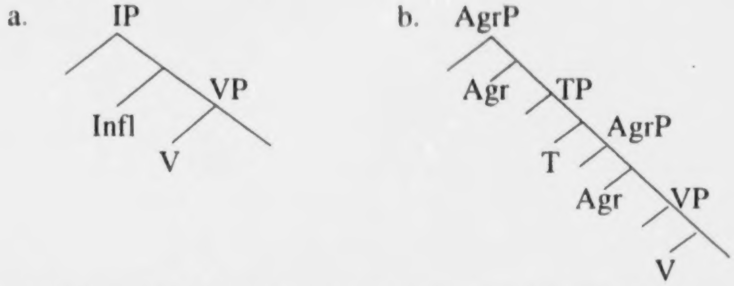
[1] She argues specifically that there is no AgrP in English or even French (contra Pollock (1989)), and proposes alternative analyses to account for the presence of verbs in a pre-adverbial position in languages like French among others and for the different word order (cf. Iatridou, 1990:563).

2.3 Bobaljik & Thráinsson (1998)

Following works by Iatridou (1990), Speas (1991), Ouhalla (1991), Bobaljik (1995) and Thráinsson (1996), B&T (1998) make the following hypothesis: Assuming that the inventory of functional projections dominating VP is not universal (e.g., the presence of Agr-Phrases is a point of parametric variation), current assumptions about locality, predict obligatory verb raising in a language with Agr-Phrases, but obligatory V in situ in a simple IP-VP configuration. B & T (1998) predict a correlation with other morpho-syntactic phenomena reflecting the presence or absence of AgrPs, the other pieces of evidence being "extra" subject and object positions, transitive expletive constructions, multiple inflectional affixes, etc…
Consider the structural configurations in (1):

(1)



With regard to the figures in (1), Thráinsson (1996:262) states:

(2) Languages that have a positive value for the SIP (Split Infl Parameter) have AgrS-P and TP as separate functional projections (1b). Languages with a negative value of the SIP are characterized by an unsplit IP (1a)).

The interaction of these assumptions entails that in languages with a simple, unsplit IP, the finite verb must not raise to Infl throughout the derivation. Furthermore, in languages with a split IP, the verb must raise out of the VP and into the IP complex.

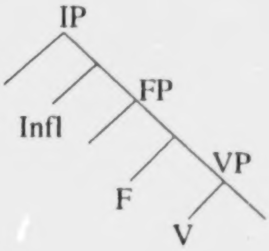
B&T's (1998:39) argument is based on the following three-fold assumption:

(3) a. The features of a projection are those of its head.
 b. Movement occurs solely for the purposes of feature checking.
 c. Features are checked in all and only local relations to a head viz., head-specifier, head complement, head-head (adjoined heads).

So, crucially, B&T (1998) maintain that all local relations are checking relations. Note that there is no motivation for subsequent (i.e. LF) movement of the verb to Infl, as in Chomsky (1991). The relevant features of both Infl and V are satisfied in situ; movement would therefore be superfluous and is, as a result, forbidden at any stage of the derivation.

Consider now the effects of introducing additional functional projections between IP and VP. In (4), B&T label this an abstract FP:

(4)



They assume that the features of Infl and V are such that they must enter into a checking relationship at some point in the derivation. In (4) though, VP is not in a local relation with Infl, hence the verb must raise to Infl to check features.

So, B & T proposed the Verb Position Diagnostic stated in (5):

(5) Verb Position Diagnostic (B&T 1998:43)
 a. If the finite verb is in VP in simple non-V2 finite environments, then no functional heads intervene between IP and VP; moreover, there is no functional head dominating IP that has features to check with V(P).
 b. If the finite verb raises out of the VP in simple non-V2, finite environments, then there must be at least two heads in the IP complex, the higher of that, at least, must have features to check with V(P).

There is a clear split within VO Germanic languages concerning the position of the finite verb.

On this issue, B &T (1998) argue that this is exactly what is expected for these languages on independent grounds, especially on the basis on verbal morphology and the syntax of argument positions. They contrast the case of Icelandic which displays V-raising in non-V2 environments, object shift and transitive expletives, to other Germanic languages like Swedish and Norwegian which do not exhibit such features. They show that postulating the Split Infl parameter helps predict additional Spec positions in one group of Germanic languages over another.[2]

In the next section, we will examine in a comparative way the behavior of various Creole verbal systems and show how postulating non universal functional projections may correctly predict different syntactic constructions among them.

3 The Case of Creoles

3.1 A General Introduction

As a rule, Creole languages display a lack or at most minimal verbal inflectional morphology, which would naturally lead us to predict that their clausal architecture would be of the English type, meaning that they would not be set with the Split Infl Parameter. On this matter, I address in this section the following issues: Given that Creoles display different positions for anterior markers, and that a few Creoles even develop inflection (meaning Tense inflection, cf. Table 3 in Appendix), it is worth considering the syntactic effects of those various positions. Furthermore, we will investigate if parametrized variation can be predicted between the Creoles with inflectional verbal morphology (Capeverdean Creole and Louisiana Creole for instance) and those without. In summary, I try to show that the position of anterior markers may be symptomatic of a different clausal architecture for the Creoles under investigation. At the theoretical level, I argue that Creoles with inflectional tense markers may have additional heads and specifiers in their clausal structure accounting for uncommon syntactic constructions (in the realm of Creole languages) such as V-raising, subject-verb inversion and post-Neg subjects. In other words, I explore a constellation of uncommon syntactic constructions that I correlate with the presence of an inflectional anterior marker. As a result, different types of clausal architectures may be generated.

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[2] For reasons of space, I refer the reader to B&T (1998:48-54) for specific examples of V-raising, object shift and transitive expletives in Icelandic.

Furthermore, while the syntactic effects of the loss of verbal morphology (as with the English language) have been widely studied, the reverse effects of morphological development and its syntactic ramifications have been granted scarce attention. This is a gap that this paper attempts to bridge.

On this issue, I summarize in the next section Baptista (to appear) where I give evidence of V-raising correlated to the distribution of anterior markers in various Creoles. I show that the affixal nature of Tense in some Creoles do have syntactic effects on word order. More precisely, I will discuss the absence of Tense inflection in Haitian, Chinook Jargon and Guinea-Bissau, and show how the behavior of verbs in those languages can be contrasted to that of verbs in Capeverdean and Louisiana Creoles (cf. Tables 1 and 2 in Appendix).

3.2 A Summary of Baptista (to appear)

In this section, I briefly summarize Baptista (to appear) where I show evidence of V-raising in Capeverdean Creole and contrast this to verbal behavior in a variety of other Creoles, may they be European or non-European based. I apply the traditional diagnostics for V-raising: A verb found in a pre-Neg position, or before floating quantifiers and VP internal adverbs is believed to have moved to such a position.

The Creoles under consideration are Capeverdean, Haitian, Guinea-Bissau Creole, Louisiana Creole and Chinook-Jargon.

3.2.1 The Case of Capeverdean Creole

Here, I examine the position of verbs with regard to the negative marker *ka* and pay particularly attention to the copula-like morpheme *e*, which is the only Capeverdean verb (it is more like a light verb or copular pronoun) that is found in a pre-Neg position. I also examine the position of the verb with regard to adverbs and floating quantifiers.

At this point, it is worth emphasizing that Capeverdean is exceptionally endowed with a Tense inflection, a feature highly unusual in the realm of Creole languages. If the past tense morpheme *–ba* is suffixed to stative verbs, it expresses simple Past, and if it is suffixed to nonstative verbs, it expresses past-before-past. A bare nonstative verb expresses a simple Past and a bare stative verb expresses the Present Tense.

3.2.1.1 The Position of Verbs Vis-à-Vis ka

When expressing sentential negation, Capeverdean *ka* must precede the main verb, as shown in (6).

(6) a. João **ka** staba na kaza.
João Neg was in house
'João was not at home.'
b.*João staba **ka** na kaza.
João was Neg at home

There is, however, one interesting exception to this generalization: Whereas all verbs follow Negation, the copula *e* generally appears in a pre-Neg position, as shown in the next subsection.

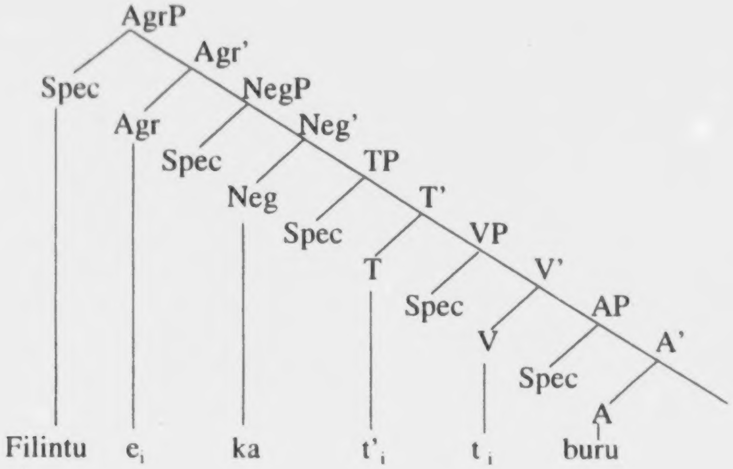
3.2.1.2 The Position of e Vis-à-Vis ka

The morpheme *e* is pre-Neg and allows the negative morpheme to immediately precede adjectival as in (7) and nominal predicates (cf. Baptista, 1997).

(7) a. Filintu e **ka** buru.
Filintu e Neg stupid
'Filintu is not stupid.'
b.*Filintu **ka** e buru.
Filintu Neg e stupid.

I propose the structure in (8) for the sentence in (7):

(8)



In summary, the copula *e* raises overtly from V^0-to-T^0 to Agr^0, landing in a pre-Neg position. On this issue, I give evidence in the next subsections that verbs can move overtly from V^0-to-T^0 at least past a certain class of adverbials and floating quantifiers.

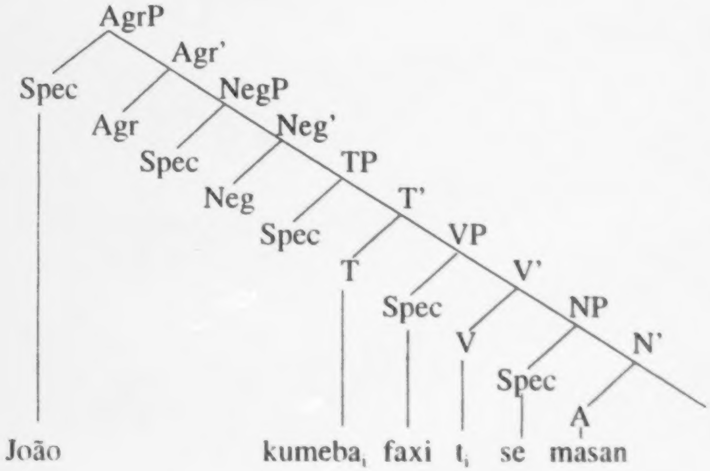
3.2.1.3 Capeverdean Verb Position With Regard to Adverbs

It is generally assumed that whether the finite verb is in V^0 or not can be determined from its position relative to a sentence-medial adverbial (i.e., an adverbial that follows the subject but precedes the complement of the verb). As shown in (9), the verb is found in a pre-adverbial position in Capeverdean Creole with this class of adverbs. As the verb precedes the adverbial, it means that it has left VP and moved from V to T^0 (at least and possibly all the way to Agr) to check Tense (and possibly Agr) features; If the verb followed the adverbial, it would still be in V^0.

(9) a. João kumeba **faxi** se masan.
João had eaten quickly his apple
'João had eaten his apple fast.'
b.*João **faxi** kumeba se masan.
João quickly had eaten his lesson
c.***Faxi** João kumeba se masan.
quickly João had eaten his apple
d.?João kumeba se masan **faxi**.
João had eaten his apple quickly

The medial adverbial is assumed to left-adjoin to VP, as illustrated in (10):

(10)



Let us now turn to some evidence from floating quantifiers which provide another diagnostic for verb movement.

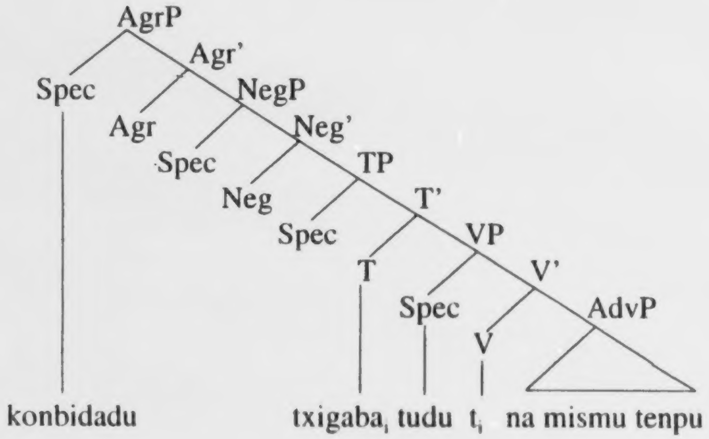
3.2.1.4 Quantifier Float in Capeverdean

Capeverdean displays the same type of quantifier float as French; hence, a floating quantifier may be postverbal, as in (11b), or preverbal, as in (11a). (11b) provides us with crucial evidence that the verb has moved to T^0 at least, given that the verb precedes the floating quantifier which has remained *in situ*.

(11) a. **Tudu** konbidadu **txigaba** na mismu tenpu.
all guests had arrived in same time
'All the guests had arrived at the same time.'
b. Konbidadu **txigaba** **tudu** na mismu tenpu.
guests had arrived all in same time
'All the guests had arrived at the same time.'

The tree in (12) crucially shows that the verb has moved to T^0 at least (and possibly to Agr), past the quantifier. In this respect, floating quantifiers, just like VP-adjoined adverbs provide clear evidence of V-raising in Capeverdean Creole.

(12)



In summary, adverbials and floating quantifiers provide clear diagnostics for overt V-raising in Capeverdean. Interestingly, evidence for additional argument positions involving subject-verb inversion with nonclitics and full DPs and post-Neg subjects lead us to believe that there are more Spec positions than is usually expected in this type of languages. We will examine those constructions in section 4. Before we do, we will briefly compare the behavior of the Capeverdean verb to Haitian, Guinea-Bissau Creole, Louisiana Creole and Chinook Jargon.

3.2.2 The Case of Haitian Creole (DeGraff, 1996)

The syntax of the Haitian verb was described thoroughly in DeGraff (1996). In terms of agreement patterns, Haitian has no overt subject-verb agreement (DeGraff, 1996:11). Haitian has TMA markers that are all preverbal and, crucially, the language has no verbal suffixes. In the presence of VP-internal adverbials, the verb always remains in V^0, as is clearly shown in DeGraff (1996:17).

Consider the Haitian sentence in (13). The Haitian verb cannot raise past VP-adjoined adverbs, as shown by the ungrammaticality of (13b).

(13) a. Bouki te ap mal manje. (Haitian)
Bouki TMA TMA badly eat
'Bouki was eating badly.'
b. *Bouki te ap manje mal.
Bouki TMA TMA eat badly

The different verbal behavior between Capeverdean and Haitian would at first seem to be due to the Tense suffix *-ba* in Capeverdean, which is nonexistent in Haitian. Haitian is endowed instead with a preverbal Tense marker, as shown in Table 2 in the Appendix.

3.2.3 The Case of Guinea-Bissau Creole

As described in Kihm (1994), Guinea-Bissau Creole does not have V-raising past Neg or VP internal adverbials, as shown in (14) and (15). It should be noted that Guinea-Bissau does have a postverbal unbound Tense marker, *ba* (cf. Table 2 in Appendix). However, the major difference between Capeverdean *–ba* and Guinea-Bissau Creole *ba* is that *–ba* is a verbal inflection found exclusively bound to verb stems in Capeverdean, whereas *ba* is a noninflectional (unbound) Tense marker in Guinea-Bissau found not only after verbs, but also after adjectival and nominal predicates.

Let us examine the position of the Guinea-Bissau verb vis-à-vis Negation, VP-adverbials and floating quantifiers.

With regard to Negation,Guinea-Bissau *ka* behaves just like Capeverdean *ka*. When it modifies a verb, it always immediately precedes it, as shown in (14):

(14) Ze **ka** **riba** inda. (Guinea-Bissau Creole)
Ze Neg return yet
'Ze has not returned yet.' (Kihm, 1994:42)

In this sense, just as with Capeverdean ordinary verbs, *ka* cannot be used as a diagnosis for V-raising. A contrast between the two Creoles however, arises with respect to VP-adverbials. Indeed, as illustrated by the example in (15), the VP-adverbial *≠iw*, "a lot", cannot occur in a preverbal position, as shown in (15b) (Kihm, personal communication):

(15) a. Jon ta **kiri** Eliza **≠iw**. (Guinea-Bissau Creole)
Jon TMA like Eliza a lot
'Jon likes Eliza a lot.'
b.*Jon ta **kiri** **≠iw** Eliza.
Jon TMA likes a lot Eliza

The unbound nature of Guinea-Bissau *ba* leads us to predict that the Guinea-Bissau verb remains *in situ* and does not move past VP-internal adverbials, as it has no features to check in T^0. This prediction is however not borne out with regard to floating quantifiers. Indeed, the Guinea-Bissau Creole quantifier *tudu* can be stranded and the verb can raise past it, just as in the case of Capeverdean. This is shown in (16):

(16) a. Konbidadu **≠iga** **tudu** na mismu tenpu. (Guinea-Bissau Creole)
guests arrived all at same time
'The guests arrived all at the same time.'
b. Konbidadu **tudu** **≠iga** na mismu tenpu.
guests all arrived at same time
'The guests arrived all at the same time.'

The example in (16a) shows that the verb can raise past the quantifier *tudu* but also has the option of remaining *in situ*, as illustrated in (16b). The data in (16) challenges the predictions we had made about the Guinea-Bissau Creole verb not moving, as it does not have any feature to check in T^0. This leads us to two possible explanations, none of which I can support over the other at this point: A first assumption is that Guinea-Bissau Creole is in the process of developing more functional projections, but does not have yet as many specifier positions as Capeverdean Creole. A second explanation is that this Creole demonstrates what some scholars (cf. Sportiche (1988), Kayne (1975), Bobaljik (1995)) have tried to prove for some time, namely that floating quantifiers and VP-internal adverbials do not occupy the same position. This would explain why in Guinea-Bissau Creole, the verb may be found in a pre-quantifier position but not in a pre-adverbial position.

In the next section, we consider the verbal behavior of Louisiana Creole.

3.2.4 The Case of Louisiana Creole

As described in Rottet (1992), there is in mesolectal Lousiana Creole a morphosyntactic alternation between full and truncated verb stems which is absent in the basilectal varieties. More precisely, the alternation is ø versus *–e*. Hence, a verb like *mõzhe* "to eat", can alternate between the full stem *mõzhe* and the truncated stem *mõzh*. Rottet (1992), who draws most of his data from Neumann (1985, 1987), notes that only the short verb stems undergo verb movement, whereas the full verb stems do not. For instance, in negative constructions, Rottet observes that the long stem form does not move, hence remains in a post-Neg position, whereas the short stem form moves and appears in a pre-Neg position. This is illustrated in (17a) and (b) respectively:

(17) a. Na lõtõ mo **pa** **mõzhe** gratõ (Guinea-Bissau)
PRS for a long time I Neg eat cracklin
'I haven't eaten cracklin for a long time.'
b. Mo **mõzh pa** gratõ.
I eat Neg cracklin
'I don't eat cracklin.' (in Rottet (1992:277) from Neumann (1985:321))

Short and long verb stems also show a discrepancy with regard to NP adverbs, such as *zhame*, "never". Such adverbs must precede the long verb stem, as in (18), whereas they can occur before or after the short verb stem, as illustrated in (19):

(18) a. Mo (te, se, sa, …) **zhame zhõngle** õho sa. (Guinea-Bissau)
I (ANT, IRR, FUT) never think about that
'I never thought/would think/will have thought about that.'
b. Mo (pa) **zhame** (te,…) **zhõgle** õho sa.
I (Neg) never (ANT,…) think about that
'I never thought about that.'
(in Rottet (1992:267) from Neumann (1985:330))

(19) a. Mo **zhame marsh** ni-pje deor. (Guinea-Bissau)
I never walk barefoot outside
'I never walk barefoot outside.'

b. Mo **marsh** (pa) **zhame** ni-pje deor.
I walk (Neg) never barefoot outside
'I never walk barefoot outside.'
(in Rottet (1992:267) from Neumann (1985:330))

The examples in (18) and (19) show that the short verb stem moves past VP adverbials, whereas long verb stems do not. This leads us to the second important observation: The occurrence of verb stems in a pre-Neg position is an innovation in Louisiana Creole. Neumann makes this explicit (Neumann, 1987:20) and this is to be correlated to the emergence of short verb stems. Then the following question arises: How can we account for the different behavior between short and long verb stems? Rottet's analysis is that verb movement in the present tense occurs, due to the presence of a *null* tense inflection which is in T^0; and this morpheme is an affix and a trigger of V-raising (Rottet, 1992:278). The long stem in contrast does not have any inflectional morphology, hence have no affix in T^0 to act as a trigger for movement (Rottet, 1992:280). As a result, the long verb stem remains *in situ*.

The case of Louisiana Creole brings an interesting question to light. It is precisely the verb stem with no overt inflection that raises to T^0, as opposed to the long stem. Note indeed in the verb forms above that the final *e* in *mõzhe* can be considered an inflection, albeit an infinitival inflection. The infinitival nature of this inflection may be preventing the raising, as it denotes the lack of Tense on the verb. Rottet argues that a *null* affix or inflectional morpheme attracts the verb to T^0. This analysis is in sharp contrast with current assumptions that *overt* morphology triggers V-raising. I would argue that the symptoms of V-raising in Louisiana Creole in the absence of overt morphology demonstrates that V-raising is occurring not due to morphology but to structural properties of the language (i.e. Split IP). From a learnability perspective, it could be postulated that a mere contrast between an inflected verbal form and a non-inflected counterpart may be all the clue the child needs to trigger V-raising (Table 2 in the Appendix shows the distribution of Tense markers in Capeverdean and Louisiana Creoles).

3.2.5 The Case of Chinook Jargon (Vrzíc, 1997)

In this section, we examine a non Indo-European Creole, Chinook Jargon (henceforth JC), and see that in CJ, as in English, the verb typically follows VP-adverbs as in (20) below. This test suggests that the verb in CJ does not move out of VP, hence there is no overt verb movement.

(20) a. Shoset **ayak** **eskom** iht lain. (Chinook Jargon)
Josette quickly take one rein
'Josette quickly grabbed one of the reins.' (Vrzíc, 1997:4)
b.*Shoset **eskom** **ayak** iht lain.
Josette take quickly one rein

Vrzíc (1997) notes that CJ verb carries no overt morphological markings for either tense or agreement. Also there are no free functional morphemes comparable to the Tense Mood Aspect markers in other Creoles. Tense definition can depend on the context of discourse or be introduced by adverbs.

The brief comparison just made between the five Creoles, Capeverdean, Haitian, Guinea-Bissau Creole, Louisiana Creole and CJ shows the complexity of the situation. However, if we assume a Split IP for Capeverdean and Louisiana Creoles correlated to verbal inflection, this will correctly predict the ability of their verbs to raise, whereas a simple IP in Haitian, Chinook Jargon and possibly in Guinea-Bissau accounts for why the verbs in these latter Creoles remain *in-situ*.

In the next section, I consider further corroborating evidence from Capeverdean Creole for assuming a structural motivation for V-raising.

4 Further Evidence for the Split Infl Parameter

This section will focus on syntactic constructions in Capeverdean Creole which may be providing further evidence for a Split Infl Parameter for this particular Creole.

4.1 Inflectional Anterior Marker

The first piece of evidence was already introduced and resides in the inflectional verbal marker. If one assumes the structures suggested in (27), with a TP and an AgrP[3] as different functional projections, and if one assumes furthermore that the verb in the VP needs to check some features with the Agr-head, then it will have to move to T^0 at least to do so. For reasons of space, I refer the reader to the tree in (10), illustrating such movement. In the next section, we consider further evidence for additional spec positions.

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[3] Note that Iatridou (1990) claims that AgrP is not necessary to account for those facts.

4.2 Additional Argument Positions

The structure proposed in (10) also helps predict that there may be two subject positions in Capeverdean. Indeed, if one assumes that Capeverdean has a split IP, one of the possible implications is that Capeverdean would have two subject positions (one in Spec AgrP and the other in Spec TP). This would account for uncommon syntactic constructions (in the realm of Creoles) such as subject verb inversion with full DPs and post-Neg subjects, as illustrated by the examples in (21) and (22).

Consider (21), where the subject and the verb have been inverted:

(21) Es ba konbida Nho Lobo un badju na Ilheu. **Ba kruja, ba ranha,**
they went invite Mr. Wolf a dance at Ilheu. Went owl, went spider,
ba korbu, ba otu pasu.
went crow, went other birds
'They went to invite Mr. Wolf to a dance at Ilheu. The owl went, the spider went, the crow went, the other birds went.' (Meintel, 1975:247)

Assuming that the verb has moved to Agr^0, the subject can be then argued to be in Spec-TP, a possible subject position, as has been proposed in Jonas and Bobaljik (1993). This is shown in the tree in (23) below. Note that to assume that the verb only has moved to T^0 would imply that the subject remains in Spec-VP, which is problematic, as it is a caseless position.

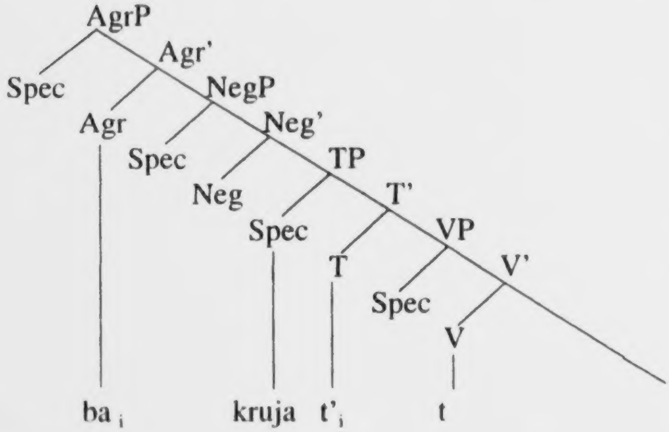
Furthermore, for the Imperative mood, the subject is obligatory found in the noncanonical post-Neg position, as illustrated by (22):

(22) a. Ka bu bai!
Neg you leave
'Don't leave!'
b.*Bu ka bai!
you Neg leave

Once again, to accommodate this word order, one needs to postulate that the pronominal subject is in Spec-TP and the verb in V, as there is no Tense features to be checked higher up in the tree.

So, the clausal architecture we would assume for Capeverdean Creole is as in (23):

(23)



Several subject positions are symptomatic of several types of positions to accommodate the distribution we have observed. To my knowledge, this is not an option available to other Creoles.

5 Concluding Remarks

To summarize, we have explored B&T (1998), who proposed that a structural account for V-raising is more explanatory than strength of features, as triggering V-movement. B&T's main assumption is that if there is an extra projection intervening between the V^0 and the head against which the V^0 has to check features, then the V^0 has to raise out of the VP. Otherwise, it does not. More precisely, they propose that separate and clearly separable tense and agreement markers count as evidence for the language learner for hypothesizing a Split IP, and different functional projections. Once one has more than one functional projection above the VP containing verbal features that the V needs to check, the V must raise out of the VP to do so. Otherwise, it does not have to raise, under Bobaljik and Thráinsson's theory. Their theory predicts that Haitian and CJ do not have V-raising because they have an IP structure. In contrast, Louisiana Creole and Capeverdean allow V-raising due to their Split IP, while Creoles such as Guinea-Bissau may still be in a stage of functional projection development.

Interestingly, B&T argued that the availability of extra subject positions is crucial to allow Transitive Expletive Constructions in Icelandic. I would like to add to such claim that extra positions may also result into different types of constructions involving not necessarily transitive expletives or object shift, but instead subject verb inversion and post Neg subjects, as illustrated by Capeverdean Creole.

Finally, in principle, B&T (1998:64) do not rule out the possibility that a language with poor verbal inflection may be endowed with a split IP (diagnosed with verb raising or extra argument positions). I hope to have shown that Creoles may instantiate just such a case. Crucially, from a learnability perspective, we could argue that a mere contrast between an inflected verbal form and a non-inflected counterpart may be all the clue the child needs to trigger V-raising in Creoles such as Capeverdean or Louisiana Creole.

Appendix

Creoles	V-Raising Past Neg	V-R past Adv.	V-R past F.Q	S-V inversion with full DPs	Post-Neg Subjects
CVC	Limited to *e*	+	+	+	+
Haitian	-	-	-	-	-
G-B	-	-	+	-	-
L-C	SF /*LF	SF/*LF	?	?	?
C-J	-	-	-	-	-

Table 1: V-raising in five creoles: A comparative analysis

(1) Stative verb+ba=Simple Past	Raising
Bare stem stative verb=Present	Raising
Nonstative verb+ba=Pluperfect	Raising
Bare nonstative=Simple Past	Raising
(2) Long form+e	No raising
Short form (null Tense affix)	Raising

Table 2: Distribution of Tense markers in Capeverdean and Louisiana Creoles[4]

Ø	Pre-verbal Marker *te*	Post-verbal unbound *ba*	Post-verbal bound Marker *–ba/e*
CJ	Haitian	Guinea-Bissau Creole	Capeverdean Creole Louisiana Creole LF

Table 3: Anterior marker typol

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[4] Inside the Table 2, (1) refers to the Capeverdean Case and (2) to the Louisiana Creole case.

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What Turkish Acquisition Tells Us about Underlying Word Order and Scrambling*

Natalie Batman-Ratyosyan and Karin Stromswold

Children acquiring fixed word order languages almost always obey the word order restrictions of their language (Brown, 1973). A critical question is whether children who are learning free word order languages also exhibit word order preferences. The goal of this study is to determine whether children, who speak Turkish (a free word order language), prefer certain word orders over others. In our study, Turkish-speaking children imitated and judged SOV, OVS, SVO and OSV sentences which were not overtly marked with accusative case. The results of our study indicate that, although both SOV and OVS are grammatical when objects are not case-marked, children treat SOV as being the word order for Turkish. We argue that this preference reflects the fact that SOV is the underlying word order in Turkish and all other word orders result from scrambling. The finding that Turkish children prefer SOV and OVS word orders to the ungrammatical word orders may reflect the fact that they have innate knowledge of the structural conditions under which verbs can assign structural case.

1 Properties of Turkish

A basic Turkish sentence with subject (S), object (O) and verb (V) can have six word orders, but the least pragmatically marked word order is SOV. Generally, subject-initial sentences are the most natural and verb-initial sentences are the least natural (Kural, 1992). Turkish is an agglutinative language with rich case-marking. Although direct objects receive (accusative) case whereas subject NPs do not receive overt case, subject and objects can scramble with equal ease (Erguvanlı, 1984; Kornfilt, 1994).

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1.1 Word Orders in the Presence of Overt Case-marking

The six Turkish case-markers indicate grammatical relations and thematic roles independently of word order, which conveys information about discourse and pragmatic factors (Kornfilt, 1994).[1] As illustrated in (1) below, all 6 possible word orders are grammatical

(1) a. S $O_{\text{-Acc}}$ V
Çocuk sandviç-i ye-di.
Child sandwich-Acc eat-past
'The child ate the sandwich' or 'The child ate the sandwich'
b. $O_{\text{-Acc}}$ V S
Sandviç-i yedi çocuk.
'(Speaking of) the sandwich, the child ate (it)'
c. $O_{\text{-Acc}}$ S V
Sandviç-i çocuk yedi.
(Speaking of) the sandwich, the child ate (it)'
d. S V $O_{\text{-Acc}}$
Çocuk yedi sandviç-i.
(Speaking of the) child, (the child) ate the sandwich'
e. V S $O_{\text{-Acc}}$
Yedi çocuk sandviç-I
(Speaking of) eating, the child (did eat) the sandwich'
f. V $O_{\text{-Acc}}$ S
Yedi sandviç-i çocuk.
(Speaking of eating), the child (did eat) the sandwich

1.2 Word Orders in the Absence of Overt Case-marking

As illustrated in (2) below, if the direct object is not case-marked, only SOV and OVS word orders are grammatical. If the direct object bears no overt case-marking it must be to the immediate left of the verb (Kornfilt, 1997).

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[1] According to Kornfilt (1994, p. 171), "topicalized constituents are sentence-initial; back-grounded constituents are postverbal; new information or focused constituents are in immediately preverbal position."

(2) a. S $O_{-\emptyset}$ V
Çocuk sandviç ye -di.
The child sandwich-Ø eat-past.
'The child ate a sandwich/sandwiches'
'The child was sandwich-eating'
b. $O_{-\emptyset}$ V S
Sandviç yedi çocuk
'(Speaking of) sandwich-eating, the child did it'
'(Speaking of) a sandwich, the child ate it'
c. *$O_{-\emptyset}$ S V
Sandviç çocuk yedi
d. *S V $O_{-\emptyset}$
*Çocuk yedi sandviç.
e. *V S $O_{-\emptyset}$
*Yedi çocuk sandviç.
f. *V $O_{-\emptyset}$ S
*Yedi sandviç çocuk.

2 Previous Studies

Children acquiring fixed word order languages almost always obey the word order restrictions of their language (Brown, 1973). For example, children learning English say "he big" but not "big he" (Bloom, 1990). However, this may merely reflect the input children receive: children acquiring English may not say "big he" because they never hear "big (is) he" in the input. A critical question is whether children who are learning free word order languages also exhibit word orders preferences. On the one hand, studies reveal that, in Turkish, both child-directed speech and children's utterances reflect the flexibility of Turkish word order (Slobin & Bever, 1982; Küntay & Slobin, 1996). On the other hand, in a longitudinal investigation of a Turkish-speaking child, Ekmekçi (1986) reported that by 1 year, 10 months (1;10) of age, the child always placed non-referential (non-casemarked) objects immediately before the verb (3a), but allowed case-marked objects to appear before (3b) or after (3c) the verb.

(3) a. $O_{-\emptyset}$ V
Kaem geti
pencil bring
Bring a pencil/pencils.

b. $O_{\text{-Acc}}$ V
Kaem-i geti
pencil-Acc bring
Bring the pencil.
c. V $O_{\text{-Acc}}$
Geti kaem-i
Bring pencil-Acc.
Bring the pencil.

The observation that this child only allowed case-marked constituents to scramble suggests that the child knew that scrambling is not freely permitted when structural case assignment is omitted.

In a landmark cross-linguistic study, Slobin and Bever (1982) asked 30 Turkish-speaking children (mean age 3;9) to imitate SOV, OVS, OSV, SVO, VSO, and VOS sentences that contained case-marked NPs. Although their performance was quite good overall (73% correct), the children were best at imitating SOV sentences (98% correct) and worse at imitating VSO sentences (67% correct). When they failed to imitate sentences exactly, their reorderings mirrored the relative frequency of word orders in Turkish: V-final strings were almost never reordered, and NVN sentences were reordered less frequently than VNN sentences. When NVN sentences were reordered they were always reordered as NNV. These results suggest that, although Turkish-speaking children allow multiple word orders when sentences contain case-marked NPs, they prefer one word order (SOV). Slobin and Bever also analyzed the relative frequency of the different word orders in children's and adults' speech (see Table 1). Looking only at sentences which contained case-marked NPs, they found that the relative frequency of NNV (Noun, Noun, Verbs), NVN, and VNN were similar for adults and children. All of children's and adult's VNN sentences were VSO[2].

Slobin and Bever (1982) also presented the children with sentences with non-casemarked objects. However, the results are reported juxtaposed with case-marked word orders, which makes them difficult to interpret. Aksu-Koç and Slobin (1985) interpret the children's responses to non-casemarked word-orders as being random.

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[2] VOS is a grammatical word order but it was not present in the speech samples collected by Slobin and Bever.

	Children 2;3-3;8		Adults
NNV (SOV+OSV)		**53%**	**56%**
	SOV	87%	86%
	OSV	13%	14%
NVN (SVO+OVS)		**37%**	**38%**
	SVO	46%	66%
	OVS	54%	34%
VNN (VOS+VSO)		**10%**	**6%**
	VSO	100%	100%

Table 1. Occurrence of word order types with overt case-marking in child and adult speech, adapted from Slobin and Bever (1982).

3 Experiment I

3.1 Subjects

Subjects were 31 monolingual Turkish-speaking children between the ages of 2;10 and 5;8. Subjects were divided into 3 groups with mean ages of 3;3, 4;2 and 5;2, respectively.

3.2 Procedure

Children were asked to imitate grammatical and ungrammatical sentences that systematically varied in plurality and word order. Following the procedures generally used for imitation experiments and outlined by Lust, Flynn and Foley (1996), children were asked to repeat exactly what the experimenter said. If the child did not respond or gave a single word response, the experimenter said "let's listen to that one another time. " Only one prompt was given per sentence. In order to receive credit for correctly imitating a sentence, the children had to repeat the sentence exactly.

3.3 Stimuli

The experiment consisted of 16 singular and 16 plural sentences, for a total of 32 sentences. Each sentence contained a subject NP (with an adjective), a verb, and an non-casemarked object NP. The experiment consisted of 8 SOV, 8 SVO, 8 OVS, and 8 OSV sentences, with each word order type occurring equally often as singular and plural sentences.[3] As shown in (4), half of the sentences were grammatical (the SOV and OVS sentences), and half were ungrammatical (the OSV and SVO sentences). Sentences were presented in random order with the restriction that no more than 4 sentences in a row have the same value for plurality or grammaticality. Half of the children received the sentences in the forward order, and half in the reverse order.

(4) a. SOV Grammatical Siyah karınca-lar yem topla -dı -lar.
Black ant -Pl food gather-Past-3rdPl
The black ants gathered food.
b. OVS Grammatical Mektup yaz -dı sarışın kız.
Letter write-PAST blond girl.
The blond girl wrote letter/letters.
c. OSV Ungrammatical Ekmek aç adam ye -di.
Bread hungry man eat-PAST
The hungry man ate bread.
d. SVO Ungrammatical Şanslı adam kazan-dı ödül.
Lucky man win -Past prize
The lucky man won a prize/prizes.

3.4 Results

A 3 (Age) x 2 (Length) x 4 (SOV, OVS, OSV, and SVO) ANOVA with correct vs. incorrect imitation as the dependent variable revealed the following significant main effects and interactions.[4] (Planned pair-wise comparisons were also performed and the results used to determine the source of main effects and interactions.) There was a significant main effect for Word Order (mean correct imitation for SOV = 72%, OVS = 60%, SVO = 46%, OSV = 43%), $F(3, 84) = 23.55$, $p<.0005$. There were also significant main effects for Age ($F(2, 28) = 21.12$, $p < .0005$, older children were more successful imitators than younger children) and Length (*F*(1, 28) = 69.29, *p* <.0005, short sentences were imitated better than long sentences). As shown in Figure 1, there was a significant interaction between Word Order and Age, *F*(6, 84) = 2.65, *p* < .05, with older children imitating ungrammatical word orders more successfully than younger children. There was also a significant interaction between Word Order and Length, *F*(3, 84) = 10.94, *p* < .0005, children imitated long, ungrammatical word order sentences very poorly. There was also a significant 3-way interaction among Word Order, Length, and Age, *F*(6, 84) = 3.87, *p* < .005.

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[3] On average, plural sentences were 12.4 syllables long and singular sentences were 9.5 syllables long and, hence, plurality and length were confounded.

[4] A 3 (Age) x 2 (Plurality) x 4 (SOV, OVS, OSV, SVO) ANOVA revealed similar findings. There were significant main effects of Word Order ($F(3, 84) = 19.39$, $p<.0005$) and Age ($F(2, 28) = 20.39$, $p<.0005$), Plurality ($F(1,28) = 46.76$, $p<.0005$, children did better on singular sentences which were on average shorter than plural sentences). There were, however, no significant interactions among these variables.

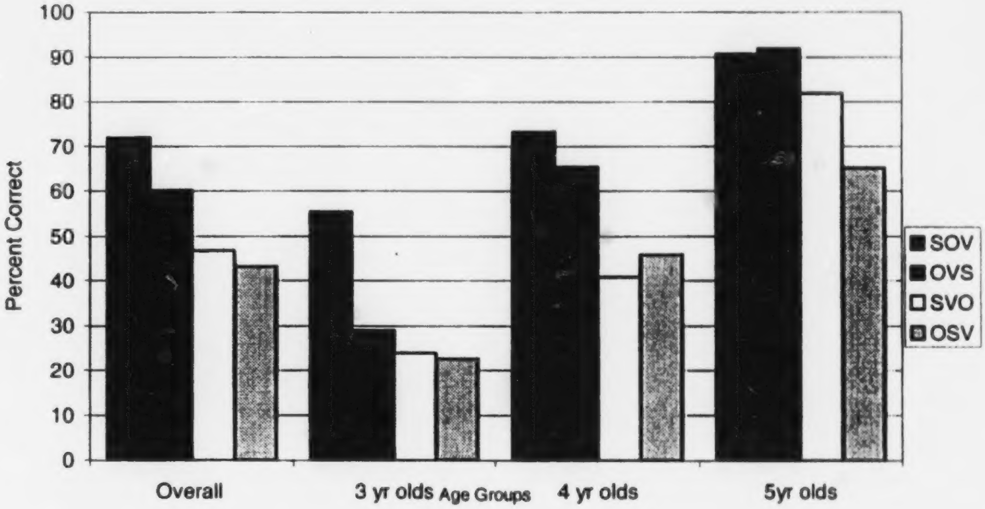

Figure 1. Children's imitation of word order types without overt case-marking

The youngest children did poorly on all but the short SOV sentences; children in the middle age group did very well on short SOV sentences (85% correct) and reasonably well (60% correct or better) on short OVS and OSV sentences and long SOV sentences; and the oldest children did well (85% correct or better) on all of the short sentences and the long grammatical sentences, and less well on the long ungrammatical sentences (69% for SOV and 44% correct for OSV).

T-tests were conducted for each age group to see whether there was a statistically significant difference in performance for the two grammatical constructions (SOV and OVS). The SOV-OVS difference was only significant for 3-year-olds, *t*(10) = 3.14, *p* = .011. *T*-tests also revealed that difference between the two ungrammatical constructions (OSV and SVO) was only significant for the five-year-olds, *t*(8) = 2.35, *p* = .047. Five-year olds' greater ease with SVO sentences might reflect the preferred status of the SVO construction over the OVS construction when constituents are case-marked (Kural, 1992).

4 Experiment II

4.1 Subjects

Nine five-year-old children (mean age 5;4) and 24 Turkish-speaking adults participated in Experiment II.

4.2 Procedure

Grammaticality judgments were obtained from the children using a puppet game technique. In this procedure, the experimenter manipulated a dog puppet and told the child that this dog puppet was "just learning how to talk" and, therefore, "sometimes makes mistakes." The child was asked to help teach the dog to talk by deciding if what the dog puppet said sounded good or bad. If it sounded good to her, she should give the dog a bone. If it sounded bad, she should give the dog a rock (see Stromswold, 1990). Adults rated the grammaticality of these sentences on a scale from 1 (bad) to 5 (good).

4.3 Stimuli

See Experiment I.

4.4 Results

A 2 (Length) x 4 (SOV, OVS, OSV, SVO) ANOVA of the five-year-olds' data revealed a significant main effect of Word Order ($F(3, 24) = 4.46$, $p = .014$). As shown in Figure 2, five-year-olds did better on SOV and OVS sentences than on SVO or OSV sentences. *T*-tests revealed no significant difference between the two grammatical word orders (SOV and OVS) or between the two ungrammatical word orders (SVO and OSV), both *p*'s >.10.

A 2 (Length) x 4 (SOV, OVS, OSV, SVO) ANOVA of the adults' data revealed a significant main effect of Word Order ($F(3, 54) = 63.93$, $p<.0005$. As shown in Figure 3, adults generally exhibited the same preferences as the children. However, unlike the children, adults had a significant preference for SOV over OVS word orders, $t(23) = 4.48$, *p*<.0005. This may reflect the rarity of non case-marked OVS sentences in Turkish. In addition, adults had a significant preference for SVO over OSV word orders, *t*(23) = 4 .41, *p*< .0005.

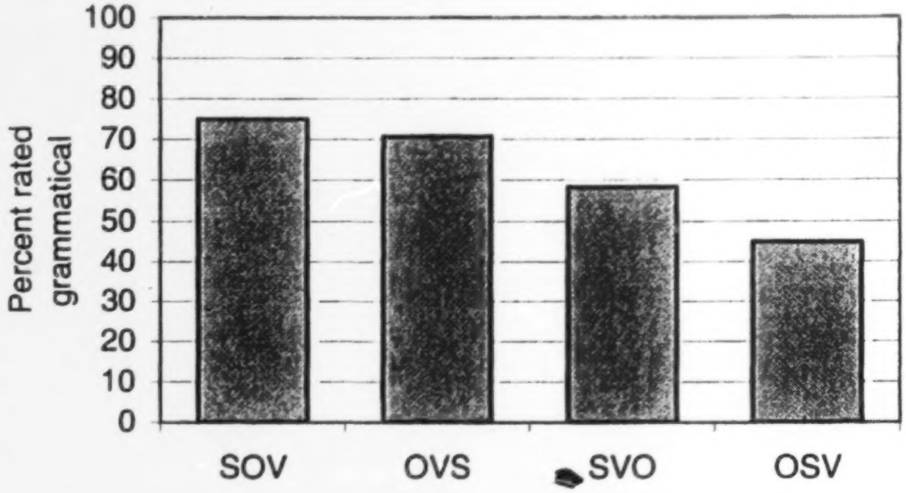

Figure 2. Five-year-old children's grammaticality judgments of word order types without overt case-marking.

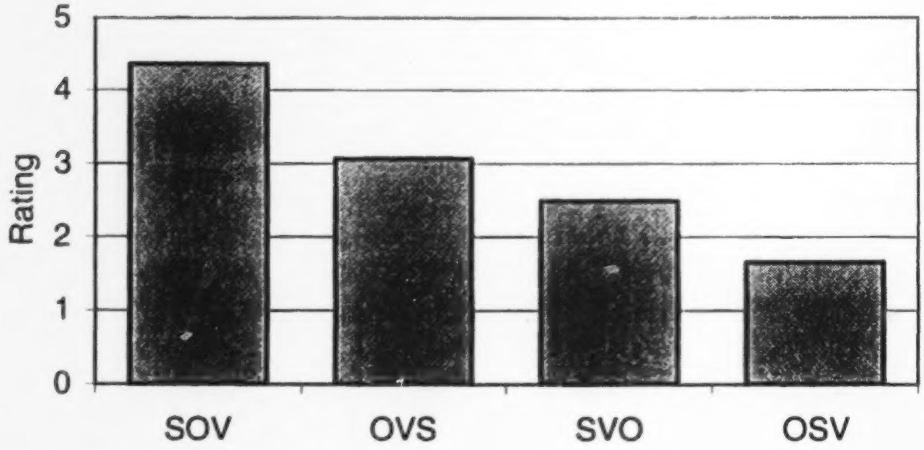

Figure 3. Adult grammaticality ratings of word order types without overt case-marking.

5 Discussion/Conclusion

5.1 Acquisitional Implications

The results of our study indicate that the three-year old children treat the SOV word order as being the primary word order in Turkish even though the input they receive is quite varied with respect to word order. For example, only 48% of the word orders in child directed speech are SOV (Slobin & Bever, 1982), and a fair proportion of child-directed utterances have neither a verb or a noun in the sentence initial and final positions[5] (Küntay & Slobin, 1996). Consistent with Otsu's (1994) results for Japanese and Slobin and Bever's (1982) results for case-marked word orders in Turkish, these acquisitional data indicate that even when children are exposed to linguistic input which indicates they are learning a free word order language, they are initially predisposed to treat one of these orders as being the word order for their language.

The four- and five-year old children treat non-casemarked OVS and SOV sentences similarly, even though OVS sentences are rare in Turkish and, in our study, received a lower preference rating by adults (see Figure 3). This suggests that, by four years of age, children know what to do in the absence of overt structural case and they use phrase structure hierarchy to determine grammaticality. Our results are consistent with Otsu's (1994) findings in Japanese. Otsu (1994) argues that Japanese's children's knowledge of case-marker drop indicates that their grammar consists of hierarchically organized phrase structures.

Case-marked OVS sentences occur less often in adult speech than subject initial (SOV and SVO) sentences (Slobin & Bever, 1982). The frequency distribution of case-marked word orders cannot provide children with a cue for non-casemarked word orders because the frequency distribution of word orders are different for case-marked and non-casemarked constructions. Additionally contrary to the distribution observed in adults' speech, case-marked OVS sentences occur more frequently than case-marked SVO sentences in children's speech. This suggests that children prefer head-final constructions, even when objects are case-marked, compared to adults who exhibit a preference for subject-initial sentences.

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[5] In our corpora, a large percentage of the mother's speech starts with an adverbial phrase.

5.2 Linguistic Implications

Our results are consistent with Kornfilt's (1994) theory which argues that both adult and child grammars of Turkish are configurational. She offers two possible explanations for the grammaticality of non-casemarked SOV and OVS sentences. One possibility is that abstract syntactic case must be assigned under government and adjacency according to X-bar theory. Another possibility, which is based on Baker's (1988) Incorporation Theory, is that heads of non case-marked NPs are incorporated into the verb (Kornfilt, 1992).

Our results also provide support to linguistic theories which argue that Turkish has an underlying word order, and that the apparent free word order of Turkish is the result of scrambling. Although clause-bound scrambling has been a hotly debated issue in linguistic circles (see, Bayer & Kornfilt, 1994; Mahajan 1994; Webelhuth, 1992). Kural (1992) argues that due to focus constraints, clause-bound scrambling is the result of A'-movement in Turkish. If Kural's hypothesis is correct, our results are consistent with the Strong Continuity Hypothesis for children's language development (Poeppel & Wexler, 1993; Pinker, 1984). The results of these imitation and judgment studies are consistent with our results, we have obtained in an act-out task for SOV and OVS actives, simple passives and genitive active and passives (Stromswold & Batman-Ratyosyan, 1999).

Appendix

1) Siyah karınca-lar yem topla -dı -lar. SOV
Black ant -Pl food gather-Past-3rdPl
The black ants gathered food.
The black ants were engaged in food gathering.
2) Mektup yaz -dı sarışın kız. OVS
Letter write-Past blond girl.
The blond girl wrote a letter/letters.
3) El neşeli yolcu -lar salla -dı -lar. OSV
Hand happy passenger-Pl wave-Past-3rd Pl.
The happy passengers waved (their) hands.
4) Tembel kapıcı boya -dı duvar. SVO
Lazy janitor paint-Past wall/walls.
The lazy janitor/doorman painted a wall/walls.

5) Diş fırçala-dı uslu çocuk. OVS
Tooth brush-Past well-behaved boy.
The well-behaved boy brushed (his) teeth.

6) Yemek ara -dı -lar benekli köpek-ler. OVS
Food search-Past-3rd Pl spotted dog -3rd Pl
The spotted dogs searched for food.

7) Hasta çocuk ilaç yut -tu. SOV
Sick child medication swallow-Past
The sick child swallowed some medication.

8) Şans-lı adam kazan-dı ödül. SVO
Lucky man win -Past prize
The lucky man won a prize/prizes.

9) Kitap oku -du -lar çalışkan öğrenci-ler. OVS
Book read-Past-3rd Pl hard-working student-Pl.
The hard-working students read a book/books.

10) Bebek genç kız bak-tı. OSV
Baby young girl look-Past.
The young girl looked after a baby/babies.

11) Çöpçü-ler topla -dı -lar çöp. SVO
Garbage-man-Pl gather -Past -3rd Pl garbage.
The garbage-men cleaned-up some garbage.

12) Telaşlı berber saç tara -dı. SOV
Hurried barber hair brush-Past.
The hurried barber brushed some hair.

13) Küçük kız -lar oyna -dı -lar saklambaç. SVO
Little girl-Pl play -Past-3rd Pl hide-and-seek.
The little girls played hide-and-seek.

14) Gözlük tak -tı güzel sunucu. OVS
Glass put -Past pretty announcer.
The pretty announcer put on (her) glasses.

15) Kum boşalt-tı -lar genç işçi-ler. OVS
Sand empty-Past-3rd Pl young worker-Pl.
The young workers emptied out some sand.

16) Taş esmer kız at -tı. OSV
Stone brunette girl throw-Past.
The brunette girl threw a stone/stones.

17) Usta balıkçı -lar balık avla -dı -lar. SOV
Master fisherman-Pl fish hunt-Past-3rd Pl
The master fisherman caught some fish.

18) Kelebek yaramaz kız -lar yakala-dı -lar. OSV
Butterfly naughty girl-Pl catch -Past-3rd Pl
The naughty girls caught a butterfly/butterflies.

19) Yuva anne kuş kur-du. OSV
Nest mother bird build-Past
The mother birds built a nest/nests.

20) Köylü kadın -lar yoğur-du-lar hamur. SVO
Peasant woman-Pl knead-Past-3rd Pl dough
The peasant women kneaded some dough.

21) Bahçe şişman bahçivan sula -dı. OSV
Garden fat gardener water-Past
The fat gardener watered (the) garden.

22) Yavru kediler fare kovala-dı -lar. SOV
Young cat -Pl mouse chase -Past-3rd Pl
The kittens chased a mouse/mice.

23) Simit al-dı aç adam. OVS
Simit take-Past hungry man
The hungry man bought a *simit* (a food item similar to a bagel).

24) Yorgun anne bulaşik yıka-dı. SOV
Tired mother dish wash-Past
The tired mother washed some dishes.

25) Su çizme-li itfaiyeci sık -tı. OSV
Water boot-with fireman spray-Past
The booted fireman sprayed some water.

26) Cam haşarı oğlan-lar kır -dı -lar. OSV
Glass mischievous boy -Pl break-Past-3rd Pl
The mischievous boys broke some glass.

27) Sabır-sız şoför çal -dı korna. SVO
Impatient driver ring-Past horn
The impatient driver honked (his) horn.

28) Düşüncesiz çocuk-lar çiçek kopar-dı -lar. SOV
Thoughtless child -Pl flower pick-Past-3rd Pl
The thoughtless children picked a flower/flowers.

29) Yeşil ördek yumurta yumurt-la -dı. SOV
Green duck egg egg -DerSuf-Past
The green duck laid an egg/eggs.

30) Yakışıklı adam kullan-dı araba. SVO
Handsom man use -Past car
The handsom man drove a car/cars.

31) İhtiyar manav-lar sat -tı -lar meyve. SVO
Old green grocer-Pl sell-Past-3rd Pl fruit
The old green grocers sold a fruit/fruits.

32) Banka soy-du -lar maskeli hırsız-lar. OVS
Bank rob-Past-Pl masked thief -Pl
The masked thieves robbed a bank/banks.

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Constituting Context: Null Objects in English Recipes Revisited[*]

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1 Introduction

This paper addresses the problem of null objects in English recipes. In general, English does not allow zero realization of object noun phrases (1).

(1)*Sandy prepared the deep-fried tofu and Kim devoured __.

However, as shown in (2), they are allowed in certain contexts.

(2) Roll each piece in kuzu or cornstarch and set __ aside.

Allowing for the possibility of null objects is straightforward, and there are several possible syntactic analyses (discussed below). The more difficult problem is accounting for their distribution, which has something to do with the non-linguistic context.

Previous discussions of null objects in English recipes make reference to the notion of register. For the purposes of this paper, *register* will be used to refer to clusters of formal linguistic properties associated with a 'context'. The term *context* will be used to refer to the socially and culturally constructed concomitants of an utterance or text. This includes what Hymes (1972) calls *setting* and *scene* as well as his *ends* (goals and purposes) and *participants* together with the recognition that all of these components are socially constituted by the acts of the participants.

The definition of register given above is not controversial. However, the view of context taken up here is at odds with the way context is treated in most previous syntactic work on register. Such work usually assumes that contexts exist independent of people and prior to the linguistic acts that reflect them. One of the purposes of this paper is to articulate a view of register that does not rely on this reification of contexts.

The other purpose of this paper is to explore the implications of the distribution of null objects for a competence theory of syntax. Culy (1996) argues that such phenomena require a second component of language knowledge,

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[*] I would like to thank Chris Culy, Mary Rose, Ivan Sag, Tom Wasow and Arnold Zwicky for helpful discussion of this paper.

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dubbed 'the user's manual'. Haegeman 1987 argues that separate registers are generated by separate grammars with different parameter settings. Here I will be arguing for a view of grammar akin to that proposed in Hudson 1996. On this view, monolingual speakers have one grammar that includes social information linked to individual words and constructions.

In the remainder of this paper, section 2 will present the data. Section 3 will review previous analyses. Section 4 presents the case for non-reified context. Finally, section 5 presents a new HPSG analysis of null objects in English.

2 Data

This section presents the data to be accounted for by any analysis of null objects in English, relying heavily on Culy's (1996) VARBRUL analysis of null objects in recipes.

2.1 Null Objects in Recipes

Culy's modern corpus[1] consisted of the direction portions of 50 recipes, 10 each from five modern cookbooks. Each token was a potential object noun phrase, either an overt object noun or an instance where the verb selects for an object but none was expressed. In the 50 recipes there were 675 such tokens.

Culy coded the data for the factor groups shown in Table 1. The dependent variable was the form of the noun phrase, either noun, pronoun or zero. There were two syntactic factors, the morphological form of the selecting verb, and the grammatical function of the antecedent to the object noun phrase. Culy included the referent of the object noun phrase as the semantic factor. The discourse factor was lookback, or the number of clauses to last mention. Finally, the source cookbook was coded as an index of style.

The percentage of zeros or null objects as a portion of all object noun phrases ranged from 29.1% in the cookbook with the fewest zeros to 45.4% in the cookbook with the most. When nouns are excluded and Culy considers the ratio of zeros to zeros and pronouns together, the range is from 80.4% in the cookbook with the fewest zeros, to the cookbook with the most zeros becoming a knockout factor.

There are several important things to note in Culy's results. The first is that null objects occur frequently in recipes, and that this frequency varies across cookbooks. Even more striking is the high portion of zeros among all

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[1] He also presents a very interesting diachronic study.

Group	Factors	Type
form	noun, pronoun, zero	dependent variable
verb form	imperative, present part., infinitive, inflected	syntactic
grammatical function of antecedent	subject, object, oblique indeterminate, none	syntactic
referent of the object NP	"finished", "almost done" "working on", "other"	semantic
distance to last mention	number of clauses (max 20)	discourse
source	cookbook code	style

Table 1: Factor groups in Culy 1996

pronominals, that is zeros and pronouns together. In fact, when Culy restricted his corpus to the pronominals, the only factor group that was significant in the VARBRUL runs was *source*, that is, individual style. Further, the discourse factor was significant in all of the runs Culy did except that comparing only zeros to overt pronouns. Culy draws from this the conclusion that null objects pattern very closely with overt pronouns in their discourse properties.

These empirical results are important because they further constrain the syntactic analysis of these facts. The preferred analysis will represent the discourse similarities between over pronouns and zeros as well as the stylistic differences between them.

2.2 Null Objects Outside Recipes

Although most studies of null objects use recipes as data, null objects also occur in other contexts. Sadock (1974) discusses null objects in product labels (3) and Fitzpatrick et al. (1986) find them in Navy message narratives (4). It would not be surprising to find them in still other contexts.

(3) Keep __ out of reach of children.

(4) 72 manhours expended to correct __.

Although the only studies I'm aware of concern the written modality, null objects also occur in the spoken language. For example, I found three tokens while listening to 13 minutes of the program "Vegetarian Cooking Secrets of

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the CIA (Culinary Institute of America)". They come from two chefs who both sounded like native speakers of English.[2]

(5) The vinaigrette is just simple
all it is is lemon juice
lemon juice
with a little bit of salt
whenever you make a vinaigrette it's good to add salt
again, it's a flavor enhancer
we're then going to whisk in
pure olive oil
extra virgin olive oil
after you've **whisked** __ (.) and made a bit of an emulsification
you wanna make sure you taste your vinaigrette

(6) We're gonna plate it now.
When you **plate** __, make sure
that you give the fennel
some height

(7) Okay, we're also gonna add some
tomatillo
the little green husk tomatoes
some cilantro
and a little bit of tomato paste
(.)
and **season** __ with a little salt

This section has shown that, while null objects are unacceptable in the decontextualized sentences usually studied by linguists, they are common in recipes and in some other contexts. I now turn to a review of previous analyses of this phenomenon.

3 Previous Analyses

As far as the syntax is concerned, Culy (1996) identifies three types of analysis: deletion accounts, which involve a rule that deletes an object noun phrase;

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[2] In these examples, the line breaks represent intonational units. The null objects are represented with __ and the verbs with dependent null objects are in **bold face**. The symbol (.) represents a pause.

semantic accounts, where a special entry for the selecting verb causes the object position to be present in the semantics but not in the syntax; and empty category accounts.

As for the relationship to non-linguistic context, again there are three extant proposals: multiple grammars, with the choice of grammar dependent on context; a single grammar augmented with a 'user's manual'; and a single grammar with social information integrated in the grammar itself.

The following subsections summarize two existing analyses which each instantiate one combination of syntactic analysis and view of grammar.[3]

3.1 Culy 1996

Culy's answer to the problem of the restricted distribution of null objects is to make use of a separate component of linguistic knowledge. He writes, "The regularities of registers ... should not be expressed in the grammar *per se*, but in a separate component regulating the use of language – a sort of user's manual." (1996:112) As for the syntax, Culy's analysis is a version of the semantic account.

(8) gives an example of a lexical entry on Culy's analysis.

(8) verb: *mix*
subcategorization:

$$\text{NP:}\begin{bmatrix}\text{SUBJ}\\ \text{AGT}\\ x\end{bmatrix},\ \text{NP:}\begin{bmatrix}\text{OBJ}\\ \text{TH}\\ y\end{bmatrix}$$

semantics: "*mix* (*x*,*y*)"
[Culy 1996:113]

Here, x and y are variables in the semantics. If the object is realized overtly, the y will be linked to the semantics of that noun phrase. If it is not realized overtly, the variable y remains a free variable in the semantics. The user's manual then specifies what do with free variables. Culy (1996:113) writes, "If the usage rules do not allow for the discourse binding in a particular context (or register), then the use of the null argument will be infelicitous (or 'ungrammatical')." To paraphrase, the user's manual says things like, "if the context is a recipe, then interpret free variables in the semantics like third person pronouns." If the user's manual has no rule for interpreting free variables in the current context, then their use is ungrammatical.

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[3] Massam and Roberge (1989) is another instance of an empty category account. Since they do not discuss the relationship to non-linguistic context, this account will not be reviewed here.

3.2 Haegeman 1987

Haegeman (1987) provides an account of the multiple grammars type. She argues that 'register variation' is an instance of language-internal parametric variation. That is, that the registers of a language may differ from each other in their parameter settings (where parameters are understood as in Chomsky 1981).

Syntactically, this is an empty category approach. Haegeman argues that the null objects have properties akin to *wh*-traces and that they are in fact topic-linked traces. On the basis of this, she attributes the difference between recipe English and other English (the presence of null objects) to a difference in the setting of the parameter that is responsible for the differences between topic prominent and subject prominent languages. 'Core' English is subject prominent while recipe English is topic prominent.

4 The Relationship of Context to Register

In this section, I will argue that the two accounts discussed above involve a reification of context. Culy's user's manual makes reference to the context in order to determine the grammaticality of a string. This requires the relevant aspects of context to exist prior to the processing of the sentence. Context does exist prior to each utterance in the sense that there is shared common ground based on the exchanges so far, shared cultural beliefs, etc. However, as I will discuss below, much recent work in anthropology and sociolinguistics has shown that linguistic activity also plays a part in constituting the context.

Haegeman's account (and to a lesser extent, Culy's as well) has the further problem that it only allows for a restricted set of registers. On her account, each register has its own grammar defined at the macro level of parameter settings. While Haegeman is not explicit about the relation of register to context, we can assume by her treatment of this relation as unproblematic that registers on her account simply have one or more contexts that they are appropriate to. This leads us to a finite set of contexts that are predetermined. This too would seem incompatible with a situation in which speakers are continually mutually constructing contexts.[4]

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[4] However, I do not mean to imply that people do not have knowledge of certain social contexts as 'crystallized' entities which go with specific linguistic formulae. It is important to note that even in this case language is constitutive of context. Every time such a crystallized context occurs, it is because the participants perform or invoke it and mutually recognize that performance or invocation of which linguistic behavior

4.1 Language Constituting Context

In recent years, there has been a move in sociolinguistic research from analyzing language as reflecting social structure to researching how language plays a part in constituting social structure.

An important thread of research in this area has concerned itself with sociolinguistic variation and how it relates to speaker identity.[5] For example, Eckert (in press) is an in-depth study of how high school students produce phonological variation as a part of identity building.

The constituting work of language extends beyond identity, however. As Schiffrin writes, "language is potentially sensitive to all of the contexts in which it occurs, and … language **reflects** those contexts because it helps to constitute them." (1987:5, emphasis in original.) Schiffrin cites the phenomenon of adjacency pairs (Schegloff and Sacks 1973) where, for example, the asking of a question sets up the context for the next utterance to be understood as an answer. Another example of language constituting context comes from the use of honorifics in Japanese. For example, Kondo (1990:141–145) finds that speakers of Japanese use honorifics differentially in the different rooms of a house as part of the process of creating a formal space in one part of the house and a more informal space in another.

Finally, language can be used to 'recontextualize' events in the past or 'precontextualize' events in the future (Ochs 1992). Ochs gives a particularly clear example of recontextualization regarding praise in joint caregiver-child activities. In mainstream American culture, when a caregiver and child complete a joint activity, the caregiver will usually praise the child and downplay or mask their own role with such expressions as "Look at the beautiful castle you made!". In contrast, Western Samoan caregivers socialize young children into a reciprocal praising practice where praise by one participant is followed by reciprocal praise by the other. Thus the American caregiver recontextualizes the activity as the child's individual effort, while the Western Samoan caregiver recontextualizes it as cooperative (1992:354–355).

In summary, language has a constitutive relation to three dimensions of social reality: identity, context of utterance, and the content of the utterance. In speaking we continually construct who we are, the social situation we find ourselves in and the situation we are describing or reporting.

In the case of a recipe, it is perhaps the current context that is most obviously constructed by the linguistic choices. That is, a recipe is a *recipe* and

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is one part.

[5] Kiesling and Schilling-Estes (1998) present the various lines of research in this area and the differences between them. See also Cameron 1990.

not a description of how someone made a meal on a certain day or a poem or anything else partially by virtue of the linguistic forms which embody it. However, as Penelope Eckert points out (p.c.), the three dimensions of social reality discussed here are all interrelated and speakers never do constitutive work on one without also affecting and invoking the others.

4.2 A Social Value for Null Objects

The result of all these studies is to call into question the relationship between context and register, which was previously taken to be unproblematic. If language plays a part in constituting the context, then an account of the restricted distribution of null objects cannot appeal to context as an independent, static entity.

However, if context is seen as constituted by language and other social practices, the relationship between grammatical features and social context can be understood as similar to the relationship between linguistic presuppositions and conversational common ground as proposed in Lewis (1979). Lewis posits rules of accommodation which apply in many cases where linguistic constraints would be violated. For example, he argues that definite descriptions presuppose that the entity they pick out is the most salient entity fitting the description. In many cases, the entity picked out isn't the most salient one until the definite description has been uttered.

Similarly, we can posit a social value associated with the linguistic resource of null objects. This social value will be part of the construction of the context, etc., whenever a null object is used. Thus null objects only occur in certain contexts because, in some sense, they bring the context with them. We can create 'ungrammatical' sentences with null objects because the process of construction is delicate and relies on the hearer being able to recognize the speaker's *intention* (cf. Grice 1957 and Clark 1996). It's hard to throw in a null object willy nilly if it doesn't go well with what else is going on in the sentence/discourse.

In the case of null objects as they are used in recipes and other instructional writing, the social value for each of the three dimensions might be as sketched in (9).

(9) **Social situation:** The giving of instructions, from one in authority to one who has chosen some product. The product may be something to use (medicine) or something to make (recipe).

Identity of speaker: One in authority. In the case of cookbooks, the authority is that of a good cook. In the case of product pack-

> aging, the authors are faceless and the authority, in some cases, becomes that of the disembodied voice of truth.
>
> **Situation described:** The use or production of the product described is constructed as requiring care – it must be done just so, or something will go wrong.

Alternatively, one may apply Ochs's (1992) theory of direct and indirect indexing.[6] In this case, null objects might be associated only with the practice of giving instructions. The giving of instructions, in turn, would be associated with/co-constructed with authority and careful action. Note that it's the practice of giving instructions that is associated with authority (and with the null objects) and not simply the issuing of commands or the use of imperatives. The authority ascribed to the author of a recipe is different from the power of a superior officer in the military, and imperatives can get used when the speaker has no authority as in *Stop teasing me!* or *Help!*.

Note also that this doesn't preclude null objects from also having some other, distinct social value. Just as linguistic elements can be ambiguous in denotative meaning, there is no reason for them not to be ambiguous in social value.

To summarize, the view of the relation between contexts and linguistic forms that I am arguing for here is as follows: Speakers have knowledge of the social effect conventionally associated with individual words and constructions in the grammar and they deploy these linguistic resources in their speech and writing to constitute context and the other dimensions of social reality. Not only does this view not rely on context already 'being there', it also allows for speakers to use their linguistic competence to generate fine-grained variations in context by combining various linguistic constructions and thus their social values.

The next section shows how this view of register can be incorporated into an analysis of null objects in terms of a competence grammar.

5 HPSG Analysis

This view of the relationship between register and context articulated in the previous section demands a theory of grammar which can associate social information with words and with syntactic constructions. One theory which can make this association directly is Head-driven Phrase Structure Grammar (HPSG), and in particular recent versions of HPSG which incorporate a the notion of syntactic constructions (Sag and Wasow 1999, Ginzburg and Sag 1999).[7]

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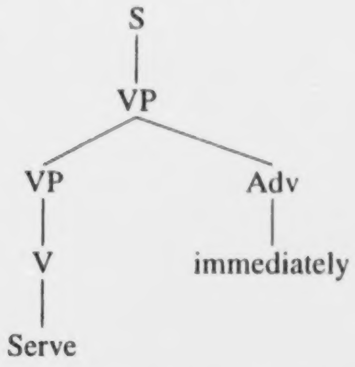
[6] I am indebted to Mary Rose for pointing this out.

HPSG views grammar as a system of signs. Signs are pairings of form (phonology and syntax) and meaning (semantics and pragmatics). These signs are modeled with feature structures. Tree structure is encoded in feature structures by means of daughter attributes.

This analysis I propose is of the semantic account type. In particular, it involves a non-branching rule that discharges one noun phrase complement requirement of a verb. In (11), which gives the proposed structure for (10) in terms of a familiar tree diagram, this non-branching rule is the lower one, where VP dominates V.

(10) Serve __ immediately.

(11)



The details of the construction that licenses the non-branching VP are given in (12).

(12)
$$\begin{bmatrix} \textit{null\_obj\_cx} & \\ \text{SYNSEM} \mid \text{LOCAL} & \begin{bmatrix} \text{CAT} & \begin{bmatrix} \text{HEAD} & \boxed{1} \\ \text{VAL} \mid \text{COMPS} & \boxed{2} \end{bmatrix} \\ \text{CONX} & \begin{bmatrix} \text{SOCIAL} & \begin{bmatrix} \text{SITUATION} & \textit{'instructions'} \\ \text{SELF} & \textit{'authority'} \\ \text{DESCRIBED} & \textit{'care required'} \end{bmatrix} \end{bmatrix} \end{bmatrix} \\ \text{HD-DTR} \mid \text{SYNSEM} \mid \text{LOCAL} & \begin{bmatrix} \text{CAT} & \begin{bmatrix} \text{HEAD} & \boxed{1}\,\textit{verb} \\ \text{VAL} \mid \text{COMPS} & \langle \textit{pro\_ss} \rangle \oplus \boxed{2} \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

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[7] Two others are Construction Grammar (Kay and Fillmore 1999) and Word Grammar (Hudson 1990).

In this rule, the feature SYNSEM represents information about the mother node. (More precisely, the information to the right of the string SYNSEM is the value of this feature. It is this value which represents information about the mother node.) The feature HD-DTR (head daughter) represents information about the daughter node. Since this is a non-branching rule, there are no other daughter features.

The syntactic effects of the rule are represented under the two CAT (for 'category') features: one inside SYNSEM | LOCAL and one inside HD-DTR | SYNSEM | LOCAL. The rule says that the first element of the daughter's complements list should be specified as a *pro_synsem*. (The complements list is $\langle \mathit{pro\_ss} \rangle \oplus \boxed{2}$). Then with the $\boxed{2}$, it says that the mother's complement requirements are the same as the rest of the daughter's original complement requirements. In this way, it discharges the direct object requirement of the daughter verb while associating pronominal semantics with that argument position.

The specification HEAD *verb* on the daughter restricts this rule to applying to verbs. Prepositions can also appear with null objects in instructional writing, as in (13) (from Haegeman 1987:243).

(13) Do not play in __ or around __.

However, the possibility of null objects appears to be more restricted with verbs than with prepositions (examples from Massam and Roberge 1989:136):

(14) a. Take foil. *Cover cookies with __ immediately.
b. Mix the lemon juice and chopped parsley. *Then sprinkle scallops with __.

Therefore examples such as (13) should most likely be treated with a separate (but related) construction.

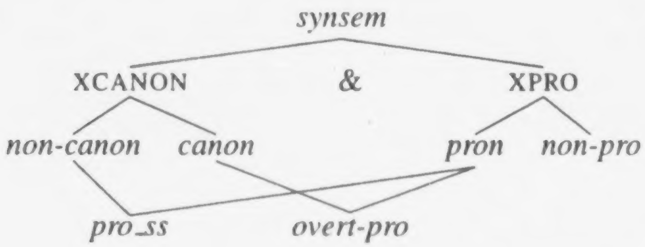
So far, this is a straightforward application of HPSG to the problem of null objects. In order to account for the distribution of this construction, I propose to add information about its pragmatic effects to this representation. These will be encoded in a new feature called SOCIAL inside the value of the existing CONX (context) feature. This information is broken down into three types corresponding to the three dimensions of social reality discussed above: information about the current situation, information about the speaker, and information about situation described. Finally, note that the feature SOCIAL is intended to encode the contribution made to the social context by the use of this construction.

Culy (1996) and Haegeman (1987) provide arguments which will allow us to test the syntactic validity of this analysis. First, there are Culy's objections to semantic accounts in general that attempt to encode register information in the grammar.[8]

Culy's first objection is that semantic accounts fail to capture the similarities between null objects and overt pronouns. The reason for this is that null objects would have to have been introduced by the verb, while overt pronouns are their own signs.

On my analysis, the null objects are introduced by a construction, which would have the same problem except that they are represented via a special synsem type, the *pro_synsem*. The parallelism between null objects and overt pronoun objects can be represented in terms of synsem types. (15) shows a part of the synsem type hierarchy.

(15)



Two of the dimensions that synsems are classified on are their canonicity and whether or not they are pronominal. Non-canonical synsem types are those, like *pro_synsem*, that never correspond to any phrase structure position. Thus while *pro_synsem* and the synsem type for overt pronouns differ in their canonicity, they both share the supertype *pronominal*. The type *pronominal* will house all the information they have in common.

Another one of Culy's objections is that as purely semantic entities, it would not be possible to represent any binding properties for the null objects. On my analysis, since *pro_synsem* is a syntactic (as well as semantic) entity, it will be possible to represent its binding properties. (16) gives a partial description of the type *pro_synsem*.[9]

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[8] Culy ends up proposing a semantic account that avoids these objections by moving the register information to the user's manual. The analysis presented here overcomes the same objections without this move largely due to advances in HPSG that have occurred in the meantime, in particular, the development of *pro_synsem* and of constructions.

[9] *Ppro* (for 'personal pronoun') is the content type assigned to pronouns as opposed to anaphors in Pollard and Sag 1994.

(16) $$\begin{bmatrix} \textit{pro\_synsem} & \\ \text{LOCAL} & \begin{bmatrix} \text{CAT} & \begin{bmatrix}\text{HEAD} & \textit{noun}\end{bmatrix} \\ \text{CONT} & \textit{ppro}\end{bmatrix}\end{bmatrix}$$

Culy also objected that creating special entries for verbs to introduce the null objects constituted an unnecessary, unmotivated, and unwieldy increase in the size of the lexicon. By using a construction instead, this analysis entails no increase in the size of the lexicon. The same lexical entry for *serve* that gives rise to *Kim served it warm* is also involved in *Serve warm*.

As a second set of tests of syntactic adequacy, there are the properties that Haegeman (1987) used to identify the empty category she posited as a *wh*-trace.

First, there is the fact that it is 'syntactically active', i.e., can control the unexpressed subject of an adjunct or of an infinitival complement:

(17) a. Bake __ until golden brown.
b. Allow __ to cool.

Here, the null object (of *bake* or *allow*) is controlling the unexpressed subject of the next phrase (*golden brown* or *to cool*). Since the null object does have a position on the argument structure list of the matrix verb, it should not be a problem to represent these control relations.

Second, Haegeman's account predicts that null objects should license parasitic gaps, as in (18) (1987:244):[10]

(18) Dry __ with a clean towel before you deepfry __.

On my analysis, this sentence would involve two separate instances of the null object construction, one for each verb. This predicts the existence of sentences like the authentic example in (19) where there is a null object in the adjunct but not anywhere else.[11]

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[10] I think this example is considerably improved if the verb in the adjunct is nonfinite, as in *before deepfrying* __.

[11] Haegeman also tries to show that null objects obey island constraints, but the purported island violations only degrade the null object examples to ?, while parallel *wh*-movement examples are rated * (Haegeman 1987:240–241):

(i) a. ?Boil eggs for the salad while you roast __.
b. *What did you boil eggs while you roasted __?

Thus is would appear that the marginal status of (ia) requires a different explanation.

(19) To serve the birds freshly stewed, let them stand 10 minutes before cutting __ so the juices do not run freely.

6 Conclusion

In this paper I have advocated two things: first, a view of the phenomenon called register in which register helps to constitute context rather than simply reflecting it, and second a view of grammar where social information is incorporated along with traditional grammatical information.

In this concluding section I would like to ask if the first conclusion entails the second. To put it differently, could either of the other views of grammar be made compatible with the view of register advocated here?

Let us start with the separate grammars approach. It seems pretty clear that this one is incompatible because it requires a fixed set of contexts, as discussed in §4 above.

Initially, the user's manual approach looks more promising, since it could be made to treat the constructions individually. In this case, the rules would not be of the form, "if the context is a recipe, then interpret free variables in the semantics like third person pronouns." Rather, the equivalent rules would be stated as "if there is a free variable in the semantics, interpret it like a third person pronoun and try to understand the context as an instance of giving instructions."

Thus, in general, it looks like a user's manual approach could be made compatible with the view of context and register advocated here. However, there is some reason to believe it might become unwieldy. In the case of null objects, Culy was able to cleverly avoid replicating the grammatical information (verb that requires a noun phrase complement in a sentence lacking that complement) in the user's manual by referring instead to semantic variables. It is an empirical question whether this would be possible for the other socially meaningful syntactic constructions. If not, then the user's manual approach requires duplicating grammatical information outside of the grammar. In this case, it seems preferable to move the social information into the grammar.

However, there still may be a use for the user's manual. This analysis is not meant to deny that people do have a notion of 'recipe' and what it entails linguistically. This kind of knowledge seems somewhat separate from sentence grammar, so this could be a good fit for the user's manual.

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Decomposing French Questions

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1 Introduction

It is well-known that in matrix contexts French combines English and Chinese properties when it comes to *wh*-questions. Like English, French fronts the *wh*-phrase; but it also allows it to stay in situ, much like Chinese.

(1) a. Qu'a acheté Jean? ('What has Jean bought?')
b. Jean a acheté quoi? ('Jean has bought what?')

The optionality that French exhibits is problematic on several grounds. For one thing, it casts doubt on the "Chengian" view on the typology of *wh*-questions (Cheng 1991), which seeks to motivate the cross-linguistic variation found in *wh*-strategies by capitalizing on the nature of (simplifying dramatically) *wh*-words and question-particles. At a more general level, French seems to flatly violate the 'minimalist' ban on 'pure' optionality, fronting appearing at first not to be a Last Resort option in (1). I will not touch upon recent interesting proposals like Bošković (1998a; to appear), and Sportiche (1995), because they all seem to fail to capture the interpretive differences between (1a) and (1b) (both sentences are assigned, roughly, the same LF).

2 French in-situ *wh* revisited

2.1 Interpretive Differences

While it is felicitous to answer a question like (2) (where fronting has taken place) by 'nothing' in French, it is *not* felicitous to answer a question like (3) (where the *wh* stays in situ) by 'nothing' (see also Chang 1997:42).

(2) A: **Qu**'a acheté Jean? 'what has J. bought?'
B: Un livre/une voiture/**rien**/... 'a book/a car/nothing'
(3) A: Jean a acheté **quoi**? 'J. has bought what?'
B: Un livre/une voiture/***!rien**

French has four strategies to form questions, as shown in (4).
(4) a. **Qui** as-tu vu? Fronting
who has you seen?

b. Tu as vu **qui**? In-situ
you have seen who?
c. **Qui** est-ce que tu as vu? Reinforced fronting
who is it that you has seen?
d. (C'est) **qui** que tu as vu? Cleft
(it is) who that you have seen?

When we concentrate on 'possible felicitous answers,' we see that fronting and reinforced fronting pattern alike in allowing an answer like 'nothing.' By contrast, in-situ and cleft strategies disallow such an answer.

There is further interesting evidence that in-situ and cleft strategies pattern alike. Some *wh*-words in French have both a strong and weak (clitic-like) forms (in roughly the sense of Cardinaletti and Starke (to appear)). For instance, the object *wh que* ('what') can surface as *qu'* or *quoi*, thus resembling non-*wh* pronouns like 3rd person *le*, which has a weak and a strong form, *l'* and *ça*, respectively. Depending on the syntactic and prosodic contexts, only one form is allowed to surface.

(5) a. **Qu'** as-tu vu? Fronting
What have you seen
b. **Qu'**est-ce que tu as vu? Reinforced fronting
What is it that you have seen
c. Tu as vu **quoi**? In-situ
You have seen what
d. (C'est) **quoi** que tu as vu? Cleft
It is what that you have seen

Given that the distribution of the strong and weak forms appears to be governed by the amount of focus put on the element, I thought it interesting to examine whether focus might explain some of the restrictions we saw on felicitous answers. And, indeed it seems that it does. Thus, much like it is impossible to answer (5c) by 'nothing,' it is impossible to use an element like *nothing* in a cleft structure.

(6) *!It is nothing/nobody that John saw

In this respect, English disallows an answer like 'nothing' to a cleft-question like (7).

(7) A: What is it that John bought?
B: *!Nothing

Given that, and other cases (like the behavior of the *wh*-NPI *quoi que ce soit* 'what that it be' discussed in Boeckx 1999), I would like to claim that in situ *wh*-phrases in French are focused, 'covert' cleft structures, so to speak, which is why they cannot be felicitously answered by 'nothing.'

Interestingly, Cheng 1991 has noted the implication of focus in optional *wh*-fronting languages like Egyptian Arabic, Bahasa Indonesia, and Palauan. In those languages, fronting seems to correspond to a cleft structure. The interesting aspect of the claim I put forward is that, if I am right, French is just the reverse of Cheng's account: here, the in-situ strategy is equivalent to a cleft structure. If correct, the analysis would then open up another space of parametric variation, leaving the 'principle' (Cheng's "Clause-Typing Hypothesis") intact—a desired result it seems to me.

But detecting the role of focus is just the starting point. We have to provide an answer as to why French in-situ structures are reverse clefts, and make the semantics of in-situ questions in French more precise.

I believe that such questions can only be addressed if we are willing to look at all sides of the grammar, for I am convinced that the cluster of properties of French in-situ questions are the result of the confluence of syntactic, semantic, and phonological (prosodic) factors.

2.2 Why Do Focused *Wh*s (Have To) Appear In Situ?

The role of focus is well-known in the literature on questions, and has often been appealed to in order to account for language-internal properties, and cross-linguistic variations. See Horvath 1986, amd much important work in its wake (Bošković (1998b), and Stjepanović (1998), e.g.)

But despite the view that focus matters, we still lack an explanation for why French differs from other Romance languages, and from Germanic languages.

To address that issue, I will capitalize on Zubizarreta's 1998 study of the interaction of focus, prosody, and word order. Zubizarreta notes that there are various, not necessarily mutually exclusive, ways of licensing focus in natural languages: via prosody (the focus of her investigation), morphology, and syntactic positioning.

As for prosody, Zubizarreta claims that the relevant 'rules' are the Nuclear Stress Rule (NSR), and the Focus Prominence Rule (FPR).

(8) Nuclear Stress Rule
Selection-driven NSR: Given two sister categories C_i and C_j, if C_i and C_j are selectionally ordered, the one lower in the selectional ordering is more prominent

Constituent-driven NSR: Given two sister categories C_i and C_j, the one lower in the asymmetric c-command ordering is more prominent

(9) Focus Prominence Rule
Given two sister categories C_i (marked [+F]) and C_j (marked [-F]), C_i is more prominent than C_j.

As Zubizarreta notes, the coexistence of the FPR and NSR in the grammar gives rise to cases in which the output of the NSR contradicts the output of the FPR. Detailed discussion leads Zubizarreta to conclude that those conflicts are resolved in Germanic via a mechanism of metrical invisibility, whereas in Spanish (and Italian), conflicts are resolved via P(rosodically-motivated) movement. For French, Zubizarreta arrives at the interesting conclusion that both metrical invisibility and P-movement are used to resolve conflicts, which according to her indicates no optionality, but coexistence of grammars (language change process, dual grammar).

Regarding interrogative sentences involving *wh*-phrases (i.e., inherently focused words), Zubizarreta notes that here, in contrast to statements, Nuclear Stress is contained within the presupposed, not the focused, part of the sentence. She therefore argues that in both Germanic and Romance focus is licensed syntactically in questions, in contrast with focus in statements, which is licensed prosodically. This leads her to make the following claim (p. 92):

(10) A fronted *wh*-phrase is licensed by virtue of occupying the specifier position of a functional category with the feature [+wh] (i.e., via the feature-checking mechanism)

For *wh*-words in situ, however, the licensing mechanism is prosody (the *wh*-word bears Nuclear Stress), as in (11).

(11) (I wonder) who bought *whát*?

She therefore assumes (p. 93 (168)):

(12) In the languages under discussion [i.e., German, English, Spanish, French—CB], a *wh*-phrase is licensed either syntactically, or prosodically, if a *wh*-phrase is already licensed syntactically.

I would like to challenge this claim, and argue that French is an exception to (12), much in the same way that it is an exception to the way a language re-solves conflicts between NSR and FPR. Note the parallel:

(13) In French, a *wh*-phrase is licensed either syntactically (*wh*-movement), or prosodically (NS on the *wh*-in situ)
(14) In French, conflicts between NSR and FPR are resolved either syntactically (P-movement), or prosodically (metrical invisibility)

The question now consists in determining whether (13) is a case of pure, 'anti-minimalist' optionality, or whether the apparent optionality results in interpretive differences at the interfaces. To know this, we have to go deeper into the realm of focus.

2.3 Refining The Notion 'Focus' And Its Relation To Cleft

The notion 'focus' has been used with a very wide denotation, so that using the term is no trivial issue. It is well-known that some type of focus, referred to as 'Focus-in-situ,' 'focus-operator,' possibly related to (some use of) 'contrastive focus' (see Szabolcsi 1981,and much subsequent work), entails uniqueness, and exhaustivity.

This type of 'Exhaustive focus' is what is found in clefts. Here I rely on Percus's 1997 analysis of clefts.

Percus argues that exhaustivity, and uniqueness in clefts come about by the presence of a covert definite description. Percus assigns a structure like (16) to a sentence like (15).

(15) It is John that killed Bill
(16) a. It is $[\alpha]_F$ that has property P
b. $[_{IP}\ [_{DP}$ the $\varnothing\ [_{CP}\ OP_i$ that t_i has property P$]]_j\ [_{VP}\ t_j$ is $\alpha]$

(16) is then converted into (17) by a rule of extraposition:

(17) $[_{IP}\ [_{DP}$ the $\varnothing\ t_k]_i\ [_{VP}\ t_j$ is $\alpha][_{CP}\ OP_i$ that t_i has property P$]_k$
|___________↑

(18) $[_{IP}\ [_{DP}$ the $\varnothing\ t_k]_i\ [_{VP}\ t_j$ is $\alpha]][_{CP}\ OP_i$ that t_i has property P$]_k$
⇓ ⇓ ⇓ ⇓
It is α that ... *Spell-Out* (=(15))

The interpretation of the null head is roughly the same as that of *one*: a predicate holding of all entities of some type or other. The basic claim made by Percus is that (15) is the equivalent of (19) (subscript F= focus).

(19) the one that killed Bill is [JOHN]$_F$

The major properties of clefts Percus seeks to account for are roughly the one identified above for *wh*-in situ in French:

1. Its presupposition: a cleft, and a *wh* in situ have the same presupposition as a sentence containing the definite description *the individual that has property P*. This will be explained by capitalizing of Percus's case for an empty D head.

2. Independent constraints on extraposition account for restrictions on clefts. I will show that similar constraints account for restrictions on the licensing of *wh*-in situ in French, most notably, the ban on in situ *wh*-phrases in embedded contexts.

The question we now have to answer is why the *wh*-phrase has not moved. That is, why the in-situ strategy corresponds to the cleft structure.

An answer is readily available if we adopt Percus's idea of an empty D head in clefts. Assume that when they appear in situ, *wh*-phrases in French are headed by an empty D. This immediately accounts for their presuppositionality (on the semantics of D and presuppositionality, see Heim and Kratzer 1998). Being headed by an empty D, *wh*s in situ have more structure than preposed ones. Could this additional structure account for why wh-Ds stay in situ? I believe it can. Cardinaletti and Starke have extensively argued that pronouns have various structural compositions, and that 'heavier' pronouns tend to stay in situ, which has syntactic and prosodic consequences. The rationale behind Cardinaletti and Starke's theory is that 'defective' elements have to move to get what they do not inherently possess. As already noted in section 2, Cardinaletti and Starke call heavy pronouns strong forms. Remember that we noted that strong forms are used in in-situ contexts. All those details converge to show that there seems to be syntactic, morphological, and prosodic evidence in favor of some additional structure in *wh*s in situ in French. The likely candidate is Percus's D head, which covers the *wh*-phrase, making it presuppositional.

The presence of an empty D has important consequences for the syntax, and semantics of French *wh*s in situ, as it does for clefts in general. As originally noted by Halvorsen 1978, and also discussed in Rooth 1999, clefts carry a specific presupposition, viz. that there is some individual that has the property P: $\exists x\ P(x)$. As Rooth 1999 has observed, this existence presupposition cannot be attributed to focus on the head: parallel sentences of the form '[α]$_F$ has the property P' don't exhibit the presupposition in question. Likewise, preposed *wh*-phrases are often said to be inherently focused, but they do not carry the presupposition of their in-situ counterparts. For instance, as already discussed above, (20b) is an acceptable answer to (20a), unlike (20c). This is because the presupposition of (20c) conflicts with the assertion that (20c) is making. No such conflict arises in the case of (20b).

(20) a. Who saw John?
b. [NObody]$_F$ saw John
c. *it is [NObody]$_F$ who saw John

So it seems that clefts introduce a presupposition that mere focus does not carry.

Besides existence, clefts also carry an exhaustivity requirement, paralleled by *wh*s in situ in French: $\forall x\ P(x) \rightarrow x = \alpha$: a presupposition that only αhas property P.

The uniqueness and existence presuppositions has broad consequences which I analyze in some detail in Boeckx 1999. For present purposes, I limit myself to noting that the uniqueness and existence presuppositions are those of the definite description (the Strawsonian view), which is precisely what Percus capitalized upon to propose a concealed description in clefts. As Percus notes (p. 342), it is known that presuppositional requirements sometimes appear to vanish under operators like negation. But it is also known that this does not happen under certain conditions. These conditions obtain when some constituent in the same clause as the presupposition carrier but not containing the presupposition carrier is in focus. If the head of a cleft obligatorily receives focus (or, if the *wh*-in situ does), then these conditions are fulfilled. So it follows that the presuppositional requirement of the definite description will always survive under operators like negation. In other words, the pattern on (20) reduces to (21).

(21) ??the one who saw John was [NObody]$_F$

As for the exhaustivity of focus in clefts, it is nothing other then the uniqueness requirement of the concealed description.

As we can see, Percus's proposal for clefts translates straightforwardly to cases of *wh* in-situ in French. The intricate interplay of syntactic, semantic, and prosodic factors account for the cluster of properties identified above.

The cleft-analysis of *wh* in situ in French has important consequences for an account of Intervention effects (Beck 1996), and begs the question of the relation of in situ *wh*-phrases in French, and D-linked *wh*-phrases ('*which*'-phrases) in English, for which an empty D-analysis has recently been put forward (See Rullmann and Beck 1998). Addressing these questions here would require much more space that I can devote here, I therefore refer the interested reader to Boeckx 1999.

In the remaining of this study, I will briefly address two questions: (i) are in-situ questions in French echo-questions?, and (ii) what explains the ban on in-situ *wh*-phrases in French in our framework?

An answer to question (i) depends on what we mean by echo question. If by echo question we mean "questions with a high + rising 'echo intonation'." or "any question said in immediate response to an utterance which is surprising, deserving repetition, or which was in part not heard, or thought not to have been heard correctly," " a request for repetition, or confirmation, or a showing of politeness, or concern, or an expression of surprise or disbelief, or the like," then clearly French in-situ *wh*s are not echo-questions. Their distribution does not match the descriptions just given. By contrast, as pointed out to me by Željko Bošković and Maribel Romero (p.c.), some definitions of echo questions may apply to our characterization of *wh*-phrases in situ in French (I give some such definitions in Boeckx 1999). So characterizing some question as 'echo' is a matter of terminology. Traditionally, echo-questions are disregarded as "syntactically uninteresting" in the literature. They seem to be licensed prosodically, period. By contrast, even if we were to say that French *wh*-in situ questions are 'echo'-questions of some sort, I believe that they exhibit interesting behavior. Moreover, there is evidence (e.g., the intervention effects studied in Boeckx 1999) that under some circumstances, *wh*-phrases in situ 'lose' their truly interrogative, cleft-readings, to become mere (repetitive) echo-questions, which is one more reason to study them in some detail.[1]

The final question I would like to address here is the ban on *wh*s in-situ in embedded contexts discussed extensively in Bošković (1998a; to appear), the crucial distinguishing factor between pure *wh*-in-situ languages like Chinese, and French.

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[1] Although I believe it to be a matter of terminology, hence not part of the scientific study of language, I am inclined to think that French in-situ interrogatives share many aspects of the Spanish "incriminatory" questions studied in Uriagereka 1988 (which he contrasts with "inquisitory" questions), and Grohmann's 1998 German "*wh*-topics," both of which show apparent 'superiority' violations.

Though space limits prevent me from going into any detail, what Uriagereka characterizes as incriminatory is a reading where what is being asked is the specific role each of the participants in the event played: the participants, and the whole event are background knowledge, the question is detail-seeking. Interestingly, Uriagereka notes that the incriminatory question has the normal declarative order that sentences have in Spanish.

For reasons that are still unclear to me, such readings are found only in multiple interrogatives in German and Spanish. An interesting avenue to explore, I think, would be to capitalize on Pesetsky's (to appear) taxonomy of "C-filling requirements," according to which languages vary as to how many *wh*-phrases must move to C. I leave this idea for future research.

(22) a. *Jean a dit que Marie a vu **qui**?
Jean has said that Marie has seen who
b. **Qui** Jean a-t-il dit que Marie a vu *t*?

(22a) can only be assigned an echo-reading (where by 'echo,' I mean purely repetitive). As Bošković (1998a, to appear) observes, the correct generalization seems not to be 'embedding' but 'embedding' under CP. As shown in (23), *wh*-phrases are allowed in situ in restructuring contexts (which have often been analyzed as either monoclausal, or VP-embedded, not CP-embedded contexts).

(23) *Jean veut que Pierre achète **quoi**?
(24) Jean veut acheter **quoi**? ('Jean wants to buy what?')

Based on this, and some intervention-data (see Boeckx 1999), Bošković concludes that covert movement of the *wh*-in situ is more constrained than overt movement. But that conclusion is not warranted once we recognize that the in-situ and preposing strategies are really distinct. The properties they exhibit might account for one being more constrained than the other without appeal to the nature of movement. However, I do think that Bošković's insight that there cannot be an intervening CP (a case of relativized minimality) is correct, but I would like to give it a different motivation.

I would like to relate the ban on CP-embedded in-situ *wh*s to some version of the right-roofed constraint, which makes extraposition upper-bound, and an island for movement. Remember that Percus wanted to derive constraints on clefts from the extraposition part he assumed for cleft-formation.

It is, I think, impossible to maintain an extraposition mechanism in French *wh*-in situ contexts,[2] but I would still like to propose that CP makes 'movement' of the *wh* in situ upper-bound (that some movement is involved to license the *wh* in situ is argued in Boeckx 1999 on the basis of Intervention data).

Note that the cleft structure requires 'adjacency' between the D-head and the element α of which property P is predicated. *That*-clauses have also been argued to have a D-feature (see Bošković 1995, e.g.), which might amount to imposing an 'upper-bound' requirement on the licensing of the *wh* in situ: a *wh*-in situ is licensed by the closest CP.

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[2] Except under Sportiche's 1995 account (coupled with a Kaynian view on extraposition (Kayne 1994)). But Boeckx 1999 shows that Sportiche's analysis is untenable, on independent grounds.

This has the immediate consequence of ruling out (22); the intermediate CP blocks association of the *wh* with the highest CP: a straightforward case of Relativized Minimality.

(25) $[_{CP} \ldots [_{CP} \ldots wh]]$
|_____x_____|

By contrast, (24), containing no CP other than the matrix one, is correctly ruled in.

For the account to work, it is crucial that the intervening CP have a D-feature (to maintain the parallelism with clefts). In other words, we predict that if the intermediate CP has a non-D, non-assertive value, *wh*-phrases will be licensed in situ in embedded contexts. Here I have to disinguish two cases. One abstractly corresponds to the following cleft-structures:

(26) it is JOHN that said that it is MARY that Bill kissed

which I would like to relate to:

(27) Jean a dit à **qui** que Pierre a vu **quoi**?
J. has said to who that P. has seen what

This structure shows that clefting is recursive, but crucially the two cleft elements have separate 'domains.' This explains why (27) cannot have a pair-list, but only single-pair reading. (See Boeckx 1999 for discussion.)

If we follow a long tradition that assumes that pair-list readings are available when all *wh*-phrases are licensed by the same Comp, clearly (27) cannot have a pair-list reading (the embedded *wh* is licensed by the embedded CP), but the presence of an interrogative matrix C has some repercussion on the embedded C: it makes a true interrogative reading available.

The second case I would like to mention is the following:

(28) **Qui** a dit que Jean a vu **quoi**?
Who has said that J. has seen what

Here, the *wh* in situ takes matrix scope, and a pair-list reading is available. I assume that this is possible because once the *wh* has reached/associated with the embedded C (whether by movement or not, see Boeckx 1999), the latter associates in turn with the matrix *wh*, by a mechanism of absorption. The crucial difference between (27) and (28) is that the matrix clause in (28) is not a cleft, it is a true interrogative clause that takes everything it c-commands under its scope.

To sum up so far, *wh*-phrases are licensed by the closest CP. If an interrogative is contained in some higher clause, the embedding C receives some special value, licensing a recursive cleft structure (narrow scope for the lowest *wh*), or triggering absorption (high scope for the *wh*).

This explanation holds for matrix verbs of the 'believe/say type;' for verbs like 'wonder' or 'ask,' facts are not different: a *wh* gets matrix scope if it is adjacent to the matrix verb (another case of absorption, I assume) (29). If it stays in situ, it can only take narrow scope (30).

(29) Jean se demande **qui** Marie a embrassé
J. wonders who M. has kissed
(30) Jean se demande si Marie a embrassé **qui**
J. wonders if M. has kissed who

3 Conclusion

To conclude this study, I have offered a new view on *wh* in situ in French, which proved necessary to account for the interpretive differences among interrogative strategies rarely discussed in the literature. I have shown that there is a definite correlation between in-situ and cleft strategies, which I have analyzed in terms of focus, capitalizing on Zubizarreta 1998 (on the PF-side), and Percus 1997 (on the LF-side). All in all, the present study strengthens the Chengian view on the typology of *wh*-questions, for which French was often seen as a major stumbling block.

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A Conspiracy Argument for Optimality Theory: Emakhuwa Dialectology

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1 Introduction

In his (1962) paper on "Phonology in generative grammar", Morris Halle introduced the leading ideas of the generative theory of synchronic phonological structure. By devoting more than half of the paper to the contribution of generative phonology [=GP] to an understanding of (a) the acquisition of phonology, (b) the historical development of sound systems, and (c) the phonological relationships among dialects of a language, Halle emphasized that an adequate theory of phonology must provide the basis not only for understanding the synchronic grammar of a single (ideal) native speaker of a language, but also for understanding (a)-(c).

In the seminal works on Optimality Theory [=OT], beginning with Prince and Smolensky (1993), it has been argued – correctly in our opinion – that OT solves the so-called *conspiracy* problem identified as long ago as Kisseberth (1970). The notion of a "conspiracy" can be summarized as follows: a *single* phonological principle may both (i) trigger one or more "repairs" (of some offensive structure) and (ii) block repairs that are designed to avoid some other offending structure. Kisseberth (1970) argued that generative phonology failed to provide an adequate characterization of conspiracies in synchronic phonological systems. It is important to recognize, however, that the conspiracy problem is not unique to synchronic grammars of a single speech variety. The notion of a conspiracy is applicable to language change, language acquisition, disordered speech, variation, dialectology – in other words, any type of phonological behavior.

In the present paper, we discuss an example of the conspiracy problem drawn from the realm of *dialectology*. Halle (1962) argued that GP (a rule-based model where speakers acquire ordered rules whose function it is to characterize the occurring patterns of alternation in a language) provides insight into the relationship among dialects by showing that dialect differences are the consequence of (i) differences in the ordering of rules and (ii) differences in the rule set. Differences in the rule set include two specific subcases: one dialect contains while another dialect lacks a given rule, or one dialect contains a more general (simpler) version of a rule in another dialect.

We argue here that there may be *conspiratorial* relationships among dialects that GP is incapable of characterizing due to its inability to separate phonological principles from the means of implementing these principles. Having established the insufficiency of GP to illuminate dialectal relationships, we then argue that OT provides a solution for the conspiracy problem in dialectology just as it does for synchronic grammars of single languages. Thus dialectology provides a significant argument for OT.

2 Emakhuwa

Our argument is based on the tonal system of Emakhuwa, a Bantu langauge spoken by over six million people in northern Mozambique, as well as adjoining areas in Malawi and Tanzania. We have studied the tonal system of over twenty dialects of Emakhuwa, but will be restricting ourselves in this paper to three: Ikorovere, Eerati, and Esaaka.

Moras in underlying representations in Emakhuwa may be either High-toned or not. We shall, for simplicity's sake, retain the usual terminology of generative phonology and refer to the contrast as one between H moras and toneless moras. In all varieties of Emakhuwa known to us, there are no *lexical* tone contrasts in verb stems. The distribution of High versus toneless moras is determined by the moraic structure of the verb stem and the morphology in which it is embedded. Furthermore, lexical tone contrasts in nominal and other stems are extremely marginal in most Emakhuwa dialects. In this paper, we do *not* discuss the subsystem of the language that determines the distribution of H tones in phonological inputs. We are only concerned here with the *phonetic manifestation* that results from these input H tones. In order to assist the reader, we underline those moras that are High-toned as a result of the morphological assignment of H tone, as well as any affixes that bear a High tone in the input. We refer to these underlined moras as *sponsors* of High tone.

In some Emakhuwa speech varieties, H tones appear in the surface just where they are located in the input. In GP terms, these dialects (largely) lack any tonal rules. This paper focuses on three dialects where GP would require the formulation of rules to account for differences between surface forms and phonological inputs.

3 Ikorovere

Ikorovere (spoken in the Tunduru district of Tanzania) clearly reveals certain very essential tonal principles that recur in a significant range of Emakhuwa speech varieties. In (1), we cite examples from the infinitive form of the verb [IP=Intonational Phrase].

(1)	IP-final	IP-medial	Gloss
	(ú̲)-lya	(ú̲-lyá)…	'eat'
	u-(thú̲)ma	u-(thú̲má)…	'buy'
	u-(thú̲mé)la	u-(thú̲mé)la…	'buy for'
	u-(má̲)ala	u-(má̲á)la…	'be quiet'
	u-(má̲á)(lí̲)ha	u-(má̲á)(lí̲há)…	'make quiet'
	u-(khó̲má)(á̲lí)ha	u-(khó̲má)(á̲lí)ha…	'strengthen'

[Some points about our presentation of output forms is required. Later, in our OT analysis of the data, we will be using the notion of a *featural domain* in place of the notion of an *autosegmental representation*. We indicate a High (Tone) Domain [=HD] by parentheses in the above data. We indicate a surface H tone with an acute accent. In the cases presently under discussion, a HD containing more than one mora is the equivalent to a multiply-linked H tone in autosegmental phonology.]

We see from the transcriptions in (1) that the first mora of a stem regularly sponsors a H tone in the input (except that when the stem is just one mora, then the prefix sponsors the H). When the stem is four moras or longer, there is a second H tone in the input, located on the third mora of the stem. We refer to this as the V1-V3 pattern of tone assignment. In Ikorovere, the V1-V3 pattern occurs in certain finite, affirmative, main-clause verb forms as well as in the infinitive.

Examination of (1) reveals, however, that there are H-toned moras in addition to the ones assigned by the V1-V3 pattern. These additional surface H tones are the consequence – in GP terms -- of the most fundamental rule of Ikorovere tonology: High Tone Doubling. It says that if there is a H tone on a mora, then there is also a H tone on the following mora.

```
(2) High Tone Doubling:     H
                           / :
                          μ  μ
```

Examples showing application of (2): **(ú̲-lyá)…, u-(thú̲má)…, u-(thú̲mé)la, u-(má̲á)la… , u-(má̲á)(lí̲há)…, u-(khó̲má(á̲lí)ha**.

There are two environments where doubling does not occur: (i) not onto the final mora of the IP, and (ii) not onto the second mora of a bimoraic syllable that is penult in the IP. Examples of (i): **(ú̲)-lya, u-(thú̲)ma, u-(má̲á)(lí̲)ha**. Example of (ii): **u-(má̲)ala**.

Rule-based models have two possible lines of attack to deal with these phenomena. One solution is to build into the doubling rule limitations that would prevent doubling in the above two environments. One problem with this approach is that it becomes clumsy if the environment must be stated *positively*. The alternative approach is to allow doubling to be fully general, but then to postulate rules that *undo* doubling in the two environments cited. Many linguists find this approach troubling since it involves over-applying doubling, and then undoing this overapplication.

(3) High Tone Doubling (restricted)

$$\begin{array}{cc} & \text{H} \\ / & : \\ \mu_i & \mu_j \end{array}$$

[Condition: if μ_i and μ_j are in the same syllable, then there must be two moras following; if they are in separate syllables, there must be one mora following.]
or:

High Tone Doubling (supplemented by the following rules):
Delink a H tone from an IP-final mora.
Delink the right branch of a multiply-linked H from the second mora of an IP penult bimoraic syllable.

The analysis in (3) is massively supported by the Ikorovere data. Additional data are provided in (4), where we cite a verb tense where there is a prefixal H-sponsor and in addition the second mora of the stem sponsors a H tone. In (5), the only H-sponsor is the negative prefix ***hi̱***.

(4) a-(k-á̱á)-li(má̱)le 'I didn't cultivate' a-(k-á̱á)-li(má̱lé)....
a-(k-á̱á)-ttha(wá̱)le 'I didn't run' a-(k-á̱á)-tthaw(á̱lé)....
a-(k-á̱á)-lo(kó̱tthá)le 'I didn't pick up'
a-(k-á̱á)-tho(kó̱lá)le 'I didn't sharpen'
kha-(y-á̱á)-ttho(kó̱lé)lacale '[cl.2] didn't use it for sharpening'
kha-(y-á̱á)-lo(ko̱ttá)nihacale '[cl.2] didn't pick up pl.'

(5) u-(hí̱)-lya 'to not eat' u-(hí̱-lyá)...
u-(hí̱-vá)ha 'to not give' u-(hí̱-vá)ha...
u-(hé̱)-etta 'to not go' u-(hé̱-é)tta...
u-(hí̱-lú)pattha 'to not hunt' u-(hí̱-lú)pattha...

Examination of these data reveals that – given the underlying distribution of H tones, the surface shapes follow automatically from (3). The only example that requires mention is **u-(hé̱)-etta** where we see that the prefix /hi̱/ combines with a following vowel-initial verb stem to yield a bimoraic vowel.

Doubling cannot go onto the second mora of this bimoraic syllable when it is penult in the phrase, cf. **u-(má̱)ala** above.

4 Eerati

The Eerati dialect (spoken in Nampula province of Mozambique) has the same V1-V3 pattern of H tone distribution in the infinitive as Ikorovere. However, examination of the data in (4) shows that this pattern is much more opaque on the surface. (Note that in this paper we do not examine the fact that certain IP-penult moras in Eerati are pronounced with a falling tone rather than a level H. This detail is of interest but not directly pertinent to the point of this paper – see Cassimjee and Kisseberth (1999) for some discussion.)

(6)	(ó̱)-lya	(o̱-lyá)...	'eat'
	o-(lí̱)ma	o-(li̱má)...	'cultivate'
	o-(má̱)ala	o-(má̱á)la...	'be quiet'
	o-(hu̱kû)la	o-(hu̱kú)la...	'brew'
	o-(ru̱kú)(nú̱)sa	o-(ru̱kú)(nú̱sá)...	'turn s.t. over'
	o-(the̱ré)(ké̱)la	o-(the̱ré)(ké̱lá)...	'cut'
	o-(má̱á)(lí̱)ha	o-(má̱á)(lí̱há)...	'make quiet'
	o-(kho̱má)(á̱lî)ha	o-(kho̱má)(á̱lí)ha...	'strengthen'
	o-(ho̱kó)(ló̱sê)ra	o-(ho̱kó)(ló̱sé)ra...	'return s.t. to'
	o-(ho̱kó)(ló̱sé)rana	o-(ho̱kó)(ló̱sé)rana...	'return ..e.o.'

A brief survey of the above data reveals a variety of cases where the mora that sponsors a H tone (assuming the V1-V3 pattern) is pronounced without a H, although the next mora in every case is H-toned: e.g. **(o̱-lyá)...**, **o-(li̱má)...**, **o-(li̱mé)la...**, and so on. In some cases, of course, there is morphophonemic variation between pronunciations where the sponsor has an overt H tone and pronunciations where it does not: e.g. **(ó̱)-lya** but **(o̱-lyá)...**, and **o-(lí̱)ma** but **o-(li̱má)...**

What accounts for the superficial differences between Ikorovere and Eerati? The answer appears to rely crucially on the following observation: In a number of Bantu languages, once a H tone "spreads" to the following vowel (using the vocabulary of autosegmental phonology), the H tone is delinked from its original location. This is sometimes referred to as High Tone Shift as opposed to High Tone Doubling. If one examines (6), it seems that a significant subset of the data can be readily understood in terms of supplementing doubling with the delinking rule in (7).

(7) Delinking
H
ǂ \
μ μ

Delinking will account for quite a few examples in (6), including **(o̲-lyá)...**, **o-(thu̲má)**, and **o-(thu̲mé)la...** However, there are other data where Delinking fails to occur. For instance, we do not get a Delinking effect in the second HD in **o-(ru̲kú)(nú̲sá)...** nor in the only HD in **o-(má̲á)la**... The cases where Delinking does not occur can be subsumed under the following two generalizations: (i) Delinking does not occur when the underlying H-toned mora is preceded by a H tone, and (ii) Delinking does not occur when the underlying H-toned mora is the initial mora in a bimoraic syllable.

How would a rule-based model have to deal with these failures of Delinking? Just as we discussed earlier, two modes of attack are logically available. We could restrict Delinking by postulating two rules that undo its effect, or we could place two conditions on Delinking. While logically available, the device of writing additional rules that undo delinking runs into serious difficulties since one cannot reinsert the H tone in the correct environments unless one has the power to "remember" that there used to be an association line present. In other words, if we have (after Delinking) a representation such as /o-ru̲kúnu̲sá.../ or /o-ma̲ála.../, what is the environment in which we add a H tone? Specifically, do we add a H tone in the above two cases but not in the following cases:

(8) underlying: /a-hó̲-epettthá̲ca/, surface: a-hé̲-épettthá̲ca '[cl.2] have
threshed'
underlying: /o-á̲tta/, surface: w-aá̲tta 'to beat'

In order to insert a H tone correctly, all of the following would have to be contained in the rule: insert an association line on a mora$_i$ just in case (a) mora$_i$ is followed by a H- toned mora, (b) mora$_i$ is underlyingly H-toned, and either (c) mora$_i$ is preceded by a H tone or (d) mora$_i$ is the first mora in a bimoraic syllable. It is of course the (b) condition that is inconsistent with GP, where rules only have access to the output of rules earlier in the derivation, not to underlying representation..

We conclude, therefore, that an analysis in GP would involve placing two conditions on Delinking. These conditions are included in (8):

(8) Delinking (revised)
H
ǂ \
μ_i μ_j
Condition: (i) μ_i is not preceded by a H tone; (ii) μ_j is not the first mora in a bimoraci syllable.

To summarize, Eerati has the same High Tone Doubling rule as Ikorovere, including the restrictions that prevent doubling onto IP-final moras (**o-(thú̲)ma**) and onto the second mora of a bimoraic IP-penult syllable (**o-(má̲)ala**). In addition, it has added the rule of Delinking in (8). Delinking disassociates the left branch of a multiply-linked H tone (only sponsors are located in this position), but just in the event there is neither a H-toned mora preceding nor is the sponsor the first mora of a bimoraic syllable (**o-(ru̲kú)(nú̲sá)…** and **o-(má̲á)la…**).

5 Esaaka

The third Emakhuwa dialect that we consider here looks, initially, like it might be one of those dialects mentioned earlier which lack doubling. Some representative examples:

(9) (ó̲-)lya (ó̲)-lya… 'eat'
o-(lí̲)ma o-(lí̲)ma… 'cultivate'
o-(rú̲)kula o-(rú̲)kula 'to pluck'

However, there are two situations where we in fact observe a doubled H tone.

(10) o-(rú̲kú)(nú̲)sa o-(rú̲kú)(nú̲)sa… 'turn s.t. over'
o-(vé̲lé)(é̲)la o-(vé̲lé)(é̲)la… 'see off'
o-(thú̲kú)(mé̲)lihaca 'shake'
o-(rú̲kú)(nú̲)wiheranaca 'turn pl. towards e.o.'

(11) o-(má̲)ala o-(má̲á)la… 'be quiet'
o-(rú̲)ula o-(rú̲ú)la… 'take from water'

What is the generalization underlying (10) and (11)? Doubling occurs (i) when the target mora is *followed* by a H-toned mora (cf. (10)), or (ii) when the target mora is the second mora of a bimoraic syllable that is further forward in the IP than the penult (cf. (11)).

In a rule-based model, we must assume a High Tone Doubling rule in Esaaka which is quite different from that which obtains in Ikorovere and Eerati. It would go roughly as in (12).

(12) High Tone Doubling (Esaaka-style)

$$\begin{array}{cc} & H \\ / & : \\ \mu_i & \mu_j \end{array}$$

[Condition: (i) μ_j is followed by a H-toned mora; (ii) μ_j is the second mora of a bimoraic syllable that is not itself in IP-penult position.]

One could omit the stipulation "that is not itself in IP-penult position" if one proposed a separate rule delinking the right branch of a multiply-linked H on an IP-penult bimoraic syllable – cf. the "supplemented" version of High Tone Doubling for Ikorovere/Eerati in (3) above. This rule of delinking would of course have to be ordered after (12).

6 The Failure of the Rule-Based Model

Given the rule-based GP model, all three dialects discussed here would have some form of a doubling rule. The rule in Ikorovere/Eerati involves a general doubling that is barred in two contexts. The rule in Esaaka, on the other hand, applies in just two specific contexts.

In an approach where restrictions on doubling are built into the doubling rule itself, we would have no possibility of seeing any particular relationship between the Ikorovere/Eerati rule and the Esaaka rule. If, however, we are permitted to take the so-called "Duke of York gambit" and allow doubling to be general and then write rules that undo its effects, then we can bring about a clear relationship among the dialects.

Specifically, if we separated out of the doubling rule any reference to IP-penult bimoraic syllables, and added a separate rule of delinking in this context, then all three dialects would share such a delinking rule. If we also separated out the reference to IP-final position in the Ikorover/Eerati rule, and postulated a rule of delinking in this position, we would end up with a simple (unqualified) doubling rule for those two dialects. This would contrast with the Esaaka rule, where doubling would occur only onto a mora followed by a H or onto the second mora of a bimoraic syllable. We would thus be able to say that Ikorovere/Eerati has a more general rule of High Tone Doubling than does Esaaka. We have made some progress in establishing dialectal relationships, though at the cost of assuming the Duke of York gambit.

But now consider Eerati. In addition to a general High Tone Doubling rule, it would also have a Delinking rule (barred from affecting a mora that is preceded by a H tone or is the first mora in a bimoraic syllable). We have shown that the restrictions on Delinking could not be separated out and replaced with rules inserting H tones into the output of Delinking. In the rule-based model, then, all one can say is that Eerati has a (fairly complex) rule that the other two dialects do not have. But is this really the full story of how Emakhuwa dialects are related? We would argue that there is a clear dialectal relationship that the GP leaves totally unexpressed by the grammar.

Specifically, the rule-based model misses the fact that the following phonological principle,

(13) Plateau
HOH must be avoided.

is a *triggering* factor for High Tone Doubling in Esaaka (double just onto a mora followed by H) and a *blocking* factor for Delinking in Eerati (delink unless preceded by a H-toned mora). Furthermore, it misses the fact that the principle

(14) No Contour Tones
H0 and OH must be avoided.

is involved both in *triggering* High Tone Doubling in Esaaka (double so as to avoid a falling tone) and *blocking* Delinking in Eerati (delinking unless one would create a rising tone).

The basis of the conspiracy argument is simply that a phonological principle can both trigger and block phonological actions. We now see that, within dialects of a single language, dialects may differ in that a principle triggers an action in one dialect and blocks an action in the other dialect. The generative phonology explanatory devices – rule reordering, rule generalization – fails to characterize the conspiratorial relationship between what triggers High Tone Doubling in Esaaka and what blocks Delinking in Eerati. In the next section, we show that Optimality Theory provides a succesful account of the dialectal relationships in Emakhuwa.

7 An OT Analysis of Dialectal Relationships in Emakhuwa

We assume a theory of tonology that we have developed within OT that we refer to as *Optimal Domains Theory [=ODT]*. The major innovation in ODT is to replace the notion of autosegmental representations with the notion of a *featural domain*. Here we confine ourselves to *High (Tone) Domains (=HD's)*, but all other featural domains are parallel. A HD is a unit of phonological structure, similar to the syllable or the foot. Like the syllable, it has a *licensing* role. In particular, a mora may be H-toned in the phonological output just in case that mora is inside a HD. Although a HD licenses a H tone, a mora inside a HD is not necessarily H-toned. ODT assumes that there is a violable constraint, Express (H), which demands that HD-internal moras be H-toned. However, there may be more highly ranked constraints which bar a mora from being H-toned. Finally, ODT assumes that featural domains are *headed* and that the head of the domain may either be at the left or the right edge.

In Cassimjee and Kisseberth (1998) and Cassimjee (1998) the following Faithfulness constraints are proposed (notice that this treatment of Faithfulness is rather more articulated than the Ident (F) constraint of standard OT).

(15) Domain Correspondence (DomCor): for every input H tone, there is a "corresponding" HD.
Incorporate (H-sponsor): every H-sponsor is inside a HD.
Basic Alignment Left (BAL): the L edge of a HD is aligned with the L edge of a H-sponsor.
Basic Alignment Right (BAR): the R edge of a HD is aligned with the R edge of a H-sponsor.
Express (H): each mora inside a HD is H-toned.

In the Emakhuwa data examined in this paper, DomCor, Incorporate (H-sponsor), and BAL are never violated. For the most part, we refrain from discussing any candidates that would violate these undominated constraints and therefore omit them from tableaux. BAR is violated as a consequence of what in the rule-based model we referred to as High Tone Doubling.

In the works referred to above, the constraint in (16),

(16) No Monomoraic HD
A HD must not contain a single mora.

is proposed as the source of "doubling" in Bantu languages. In order to achieve this effect, (16) must outrank BAR. (We shall note below that an alternative constraint, Binarity, might be employed to induce a similar result.)

Although No Monomoraic HD forces a minimal violation of BAR, it does not necessarily result in an output that has two *H-toned* moras. It will have this effect only if Express (H) is undominated. This is the case in Ikorovere. But what about Eerati, where the rule "Delinking" was proposed in a rule-based account of the language?

In Cassimjee and Kisseberth (1998) and Cassimjee (1998), the following account of Bantu languages with a rightward "shift" of H tone is proposed: HD's in these languages are R-headed. Furthermore, there is a universal constraint, given below as (17),

(17) *(H, nonhead)
A nonhead in a HD must not be H-toned.

which dominates Express (H). In order to successfully implement this analysis (as we will see below), it is necessary to assume that Express (H) is just one member of a family of constraints that in addition includes (18):

(18) Express (H on HD-heads).

The constraint in (18), if undominated, will guarantee that it is not possible to avoid violations of markedness constraints by leaving the head of the domain without a H tone.

The tableaux in (19) illustrate the analysis.

(19) **o-(lí̲mé)la**… (Ikorovere), **o-(li̲mé)la…** (Eerati)

Ikorovere system:

/o-li̲mela…/	Express (H,head)	Express	No Mono HD	BAR	*(H, nonhead)
o-(lí̲)mela…	✓	✓	*!	✓	✓
o-(li̲me)la…	*!	**	✓	*	✓
o-(li̲mé)la…	✓	*!	✓	*	*
o-(lí̲mélá)…	✓	✓	✓	**!	**
☞o(lí̲mé)la..	✓	✓	✓	*	*

Eerati system:

/o-li̲mela…/	Express (H,head)	*(H,non-head)	No MonoHD	BAR	Express (H)
o-(lí̲)mela…	✓	✓	*!	✓	✓
o-(li̲me)la…	*!	✓	✓	*	**
☞o-(li̲mé)la.	✓	✓	✓	*	*
o-(li̲melá)…	✓	✓	✓	**!	**
o-(lí̲mé)la…	✓	*!	✓	*	✓

Eerati requires, of course, further analysis, since Delinking does not occur in every context. We propose that the failure of Delinking in Eerati follows from the existence of two universal constraints (motivated on independent grounds in Cassimjee and Kisseberth (1998) and Cassimjee (1998)), given above as (13) and (14): Plateau (*H0H) and *Contour (which has two subparts, *Rise and *Fall).

We can successfuly block Delinking in Eerati if these two constraints dominate *(H, nonhead). The tableaux in (20) illustrate. We omit from these tableaux candidates that would violate No Monomoraic HD and thus omit any reference to that constraint and its interaction with BAR.

(20) **o-(ru̲kú)(nú̲sá)…**

/o-ru̲kunu̲sa…/	Express (H, head)	Plateau	*Contour	*(H, nonhead)	Express
o(rú̲kú)(nú̲sá)..	✓	✓	✓	**!	✓
o(ru̲kú)(nu̲sá)..	✓	*!	✓	✓	**
o(ru̲ku)(nu̲sa)..	*!*	✓	✓	✓	****
☞ o(ru̲kú)(nú̲sá)..	✓	✓	✓	*	*

o-(má̲á)la…

/o-ma̲ala…/	Express (H, head)	Plateau	*Contour	*(H, nonhead)	Express
o-(ma̲a)la…	*!	✓	✓	✓	**
o-(ma̲á)la…	✓	✓	*!	✓	*
o-(má̲a)la…	*!	✓	*	*	*
☞ o-(má̲á)la…	✓	✓	✓	*	✓

It is important to note that while Plateau and *Contour can produce violations of *(H, nonhead), they do *not* lead violations of other certain other constraints. For example, a rising tone occurs in all dialects when a H-sponsor is on the second mora of a bimoraic syllable: **w-a(á̱)tta** 'to beat'. We can explain this by postulating that Basic Alignment Left dominates *Contour. A domain never expands to the left of a sponsor in order to avoid a rising tone. Similarly, we noted earlier the following example from Eerati: **a-hé̱-épettthá̱ca**. A H0H sequence is tolerated when the first H is itself a "doubled" H and not a sponsor. There are perhaps different tacks that one might take to explain why a Plateau violation is permitted here. We suggest that there is a constraint, Binarity, that requires a HD to be binary (in the present instance, bimoraic). The attentive reader will note that – given just the data here – Binarity could replace No Monomoraic HD as the driving force behind doubling in Ikorovere and Eerati. We believe that *both* constraints may be necessary in universal grammar, but that is a topic beyond the scope of this paper. In any case, assuming that Binarity outranks Plateau, then we can not avoid a violation of Plateau in the case of **a-hé̱-épettthá̱ca** by extending the first domain one mora further: ***a-(hé̱-épé)(tthá̱)ca** since that would yield a trimoraic domain, violating Binarity. We also cannot extend the second domain to the left: ***a(hé̱-é)(pétthá̱)ca**, since this output would violate the undominated BAL.

We have now characterized the Ikorovere and Eerati systems except for the fact that there are two environments in which High Tone Doubling does not occur. The failure of doubling to affect an IP-final mora is gotten at, in ODT, by ranking a Nonfinality constraint over No Monomoraic HD (and/or Binarity):

(21) Nonfinality: the R edge of an IP should not be aligned with the R
edge of a HD.

This ranking guarantees that **o-(lí̱)ma**, which lacks a HD aligned with the right edge of the IP but has only a single mora in the domain, will be more optimal than **o(lí̱má)**, which has two moras but also has a HD aligned with the right edge of the IP.

We are left, then, just with the failure of doubling in **o-(má̱)ala**. We believe that ultimately **o-(lí̱)ma** and **o-(má̱)ala** should *both* be the consequence of a single constraint. However, this issue is not of direct relevance to the present paper. Consequently, we will – quite arbitrarily -- attribute the failure of doubling in **o-(má̱)ala** to the effects of the constraint in (22):

(22) Avoid Bimoraic Penult
IP-penult bimoraic syllables should not be aligned with the R edge of a HD.

(22) is dominated by Faithfulness – hence an example such as **w-a(á̲)tta** will be optimal, despite having the right edge of the HD aligned with the right edge of a bimoraic IP-penult syllable. On the other hand, (22) dominates No Monomoraic HD, making **o-(má̲)ala** more optimal than **o-(má̲á)la**, despite the fact that it violates No Monomoriac HD. (22) will also have to dominate *Contour, since it prefers a falling tone to a level H tone.

We have now provided an account of the Ikorovere and Eerati dialects of Emakhuwa. These two dialects share the ranking of No Monomoraic HD/Binarity over BAR. They differ in that Ikorovere ranks Express (H) over *(H, nonhead), while Eerati has the reverse ranking (although Express (H, head) is undominated in both dialects). They also both rank Nonfinality and Avoid Bimoraic Penult (assuming that these constraints are not, under a deeper analysis,. the same constraint) above No Monomoraic HD. Even though Eerati ranks *(H, nonhead) above Express (H), there will be cases where nonheads are H due to the fact that Plateau and *Contour dominate *(H, nonhead).

Now, what about Esaaka? Since Esaaka lacks general doubling, it must differ in a very significant way from the other two dialects: BAR dominates No Monomoraic HD. Why does doubling *ever* occur in this dialect? Because Plateau and *Contour dominate BAR. Consequently, a HD will be expanded just in order to avoid a violation of Plateau or *Contour. The tableaux in (25) illustrate.

(23) **o-(rú̲kú)(nú̲)sa**

/o-ru̲kunu̲sa/	Express (H)	Plateau	*Contour	BAR	NoMono HD
o-(rú̲)ku(nú̲)sa	✓	*!	✓	✓	**
o-(ru̲)ku(nú̲)sa	*!	✓	✓	✓	**
o-(rú̲)ku(nu̲)sa	*!	✓	✓	✓	**
o-(rú̲kú)(nú̲sá)	✓	✓	✓	**!	✓
☞o(rú̲kú)(nú̲)sa	✓	✓	✓	*	*

o-(má̲á)la…

/o-ma̲ala…/	Express (H)	Avoid Bi Penult	*Contour	BAR	NoMono HD
o-(ma̲á)la…	*!	✓	*	*	✓
o-(má̲)ala…	✓	✓	*!	✓	*
☞o-(má̲á)la….	✓	✓	✓	*	✓

In the preceding tableaux, we showed Express (H) as being undominated in Esaaka. Whether HD's consist of a single mora in Esaaka (due to the high ranking of BAR) or two moras (as a consequence of the fact that Plateau and *Contour outrank BAR), there are no domains where a mora fails to express H tone. Thus there is every reason to assume that *(H, nonhead) is too lowly ranked in Esaaka to have any effect.

Optimality Theory differs from generative phonology in that there is only one device – the ranking of constraints – that can be the source of dialectal differences (excluding, of course, the real possibility of differences in the lexical inputs). So do the crucial differences among these dialects follow from differences in the ranking of the constraints? The answer is clearly in the affirmative. Let us summarize the differences.

(24) (a) In Ikorovere and Eerati, No Monomoraic HD dominates BAR, while in Esaaka the reverse ranking holds.
(b) In Ikorovere and Esaaka, Express (H) dominates *(H, nonhead), while in Eerati the reverse ranking holds.
(c) In Eerati, Plateau and *Contour dominate *(H, nonhead). There is no critical evidence in Ikorovere and Esaaka in this connection since in any case *(H, nonhead) is ranked below Express (H).
(d) In Esaaka, Plateau and *Contour dominate BAR. In Ikorovere and Eerati, there is no evidence in this connection since in any case No Monomoraic HD dominates BAR and will achieve the same results.

Notice that the above account in fact succeeds in characterizing the conspiratorial relationships in these Emakhuwa dialects. Plateau both blocks "Delinking" in Eerati (by outranking *(H, nonhead)) and triggers "Doubling" in Esaaka (by outranking BAR). Similarly, *Contour both blocks "Delinking" in Eerati and triggers "Doubling" in Esaaka (though we should note that it is *Rise that blocks "Delinking" in Eerati and *Fall that triggers "Doubling" in Esaaka).

We conclude that OT provides the basis for understanding the conspiracies that may arise in dialectology, and that these conspiracies provide evidence favoring OT over rule-based models which are inherently incapable of providing a unified account of conspiracies (due to the rule-based model's failure to separate phonological actions from the principles that induce these actions). In our opinion, the conspiracy argument – be it based on the synchronic grammar of a single dialect, or different dialects of the same language – remains the primary cornerstone of the evidence for OT.

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Light-Headed Relatives[*]

Barbara Citko

1 Introduction

In addition to the familiar Headed and Headless Relatives (1-2), many languages allow relatives headed by demonstrative pronouns (3). I refer to such relatives as Light-Headed Relatives. This paper, drawing primarily on data from Polish, provides a new account of their syntax and semantics.

(1) Jan śpiewa piosenkę którą Maria śpiewa. *Headed Relatives*
Jan sing song which Maria sings
'John sings the song that Mary sings.'
(2) Jan śpiewa cokolwiek Maria śpiewa. *Headless/Free Relatives*
Jan sings whatever Maria sings
'John sings whatever Mary sings.'
(3) Jan śpiewa to co Maria śpiewa. *Light-Headed Relatives*
Jan sings DEM what Maria sings
'John sings what Mary sings.'
(*Lit.* 'John sings this what Mary sings.')

The analysis I develop for Light-Headed Relatives relies crucially on the contribution of a demonstrative pronoun, which I argue parallels the contribution of a demonstrative pronoun in an equative statement (4).

(4) Cycero to Tully. *Equatives*
Cycero DEM Tully
'Cycero is Tully.'

The paper is structured as follows: I begin by examining the properties of Light-Headed Relatives that distinguish them from Headed and Headless Relatives. Next, I discuss the parallels between Light-Headed Relatives and Equatives. I argue that both Equatives and Light-Headed Relatives involve an equative copula selecting a small clause constituent. The only difference between them lies in the internal structure of the small clause. In the case of equative statements, it is composed of two Noun Phrases (5a), whereas in the case of Light-Headed Relatives it is composed of two clauses (5b).

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(5) a. $[_{TP}\ T^0\ [_{SC}\ DP_1\ DP_2]\ ]$ *Equatives*
b. $[_{TP}\ T^0\ [_{SC}\ CP_1\ CP_2]\ ]$ *Light-Headed Relatives*

2 Properties of Light-Headed Relatives

2.1 Light-Headed Relatives versus Headless and Headed Relatives

The most notable difference between Headless and Light-Headed Relatives concerns their behavior with respect to Case Matching. Matching in this context refers to the requirement for the case of a wh-pronoun inside the relative clause to match the item selected by the embedding predicate.

(6) Case Matching: $\beta\ [\text{wh-word}_{\alpha case}\ .\ .\ .\ ]_{\alpha case}$

The contrast in grammaticality between (7a) and (7b) shows that only Headless Relatives are subject to the matching requirement.

(7) a. *Przepytam [kto$_{NOM}$ pierwszy przyjdzie]$_{ACC}$
I-question-PERF who first comes-PERF
'I will question who comes first.'
b. Przepytam tego$_{ACC}$ kto$_{NOM}$ pierwszy przyjdzie.
I-question-PERF DEM who first comes-PERF
'I will question the one who comes first.'

This might suggest that Light-Headed Relatives are simply Headed Relatives, where instead of a full nominal the head is a demonstrative element. If this were the case, any differences between the two would remain hard to account for. They differ, however, in at least one respect, i.e. the range of relative pronouns they allow. Thus, in Polish Headed Relatives the only admissible relative pronoun is *który* 'which'. By contrast, in Light-Headed Relatives *kto* 'who' is perfectly grammatical as a relative pronoun. This is shown by the contrast in grammaticality between (8) and (7b) above.

(8) Przepytam studenta który/*kto pierwszy przyjdzie.
I-question-PERF student which/ who first comes-PERF
'I will question the student who comes first.'

2.2 Word Order in Light-Headed Relatives

In Light-Headed Relatives, the order between the matrix and the relative clause is quite free. In addition to 'canonical' Light-Headed Relatives (9a), Polish allows 'inverse' Light-Headed Relatives, in which the relative clause precedes the matrix clause (9b). Inverse Light-Headed Relatives are standardly referred to as Correlatives.[1]

(9) a. Jan śpiewa to co Maria śpiewa.
Jan sings DEM what Maria sings
'John sings what Mary sings.'
b. Co Maria śpiewa to Jan śpiewa.
what Maria sings DEM Jan sings
'What Mary sings, John sings.'

The examples in (10-13) show that the same kind of variation in the order of the matrix and the relative clause occurs not only in relatives headed by nominal elements, but also those headed by place, manner, temporal and reason adverbials.

(10) a. Pojadę tam gdzie mnie wyślesz. *place*
I-go-PERF there where me you-send-PERF
'I will go where you send me.'
b. Gdzie mnie wyślesz tam pojadę.
where me you-send-PERF there I-go-PERF

(11) a. Zaśpiewam tak jak Maria zaśpiewa. *manner*
I-sing-PERF DEM how Maria sings-PERF
'I will sing the way Mary sings.'
b. Jak Maria zaśpiewa tak zaśpiewam.
How Maria sings-PERF DEM I-sing-PERF

---

[1] I am glossing over the nontrivial issue of whether Slavic languages have true Correlatives of the kind found in the Indo-Aryan languages. For relevant discussion, see Izvorski 1996 and Bhatt 1999.

(12) a. Zaśpiewam wtedy kiedy Maria zaśpiewa. *temporal*
I-sing-PERF then when Maria sings-PERF
'I will sing when Mary sings.'
b. Kiedy Maria zaśpiewa wtedy zaśpiewam.
when Maria sings-PERF then I-sing-PERF

(13) a. Zaśpiewam dlatego dlaczego Maria zaśpiewa. *reason*
I-sing-PERF DEM why Maria sings-PERF
'I will sing for the same reason that Mary sings.'
b. Dlaczego Maria zaśpiewa dlatego zaśpiewam.
why Maria sings-PERF DEM I-sing-PERF

Furthermore, these examples show a clear morphological relationship between wh-words and demonstrative words; the relative clause always contains a wh-word and the matrix clause a corresponding demonstrative word (henceforth referred to as D-word).[2] In Polish the two differ only with respect to the initial morpheme; *k*- in wh-words and *t*- in D-words.

(14)

a. wh-words		b. D-words
c-o	'what'	*t*-o
k-to	'who'	*t*-en/*t*-a
j-ak	'how'	*t*-ak
gdzie	'where'	*t*-am
k-iedy	'when'	w-*t*-edy
dla-*cz*-ego	'why'	dla-*t*-ego

D-words can thus be thought of as being a result of lexical incorporation of a reduced form of a definite morpheme into the indefinite pronoun. This accords with quite an old insight, going back at least to Klima 1964, that wh-pronouns are indefinite pronouns plus an interrogative feature, and by analogy that demonstrative pronouns are indefinite pronouns plus a D feature.

---

[2] We see a similar morphological opposition in English:

(*i*)

a. wh-words	b. D-words
wh-o	*th*-ey
wh-om	*th*-em
wh-ere	*th*-ere
wh-at	*th*-at

(15) a. wh-word = WH + indefinite
b. D-word = D + indefinite

The feature decomposition of demonstrative pronouns heading Light-Headed Relatives is crucial to the analysis I develop in Section 4. First, however, let me examine another construction where demonstratives appear, and whose syntax will serve as background for the analysis of Light-Headed Relatives.

3 Equative Statements

One of the demonstrative pronouns, namely *to* 'this', besides heading nominal Light-Headed Relatives, has another rather nonstandard use. It occurs in specificational and equative statements, as shown in (16-17).[3]

(16) Mój najlepszy przyjaciel to Jan
my best friend DEM Jan
'My best friend is Jan.'

(17) Gwiazda poranna to gwiazda wieczorna.
star morning DEM star evening
'The morning star is the evening star.'

I assume that *to* in (16-17) is a D^0 element situated in T^0; henceforth, I refer to it as a Determiner Copula. In Polish the demonstrative *to* can function only as an equative copula.[4] In unambigously predicational sentences the lexical verb *być* 'be' is used instead.

(18) Jan jest studentem
Jan is student-INSTR
'Jan is a student.'

---

[3] The use of pronominal like elements in nominal copular structures is by no means unique to the Slavic family of languages; we find it in a number of languages typologically unrelated to Slavic: Hebrew, Arabic, Haitian and Capeverdian Creoles, to name just a few.

[4] On the assumption that specificational statements involve some form of identification, and are thus related to specificational statements, the fact that we find the same copula element in both is to be expected.

Some evidence in favor of the conclusion that the Determiner Copula *to* in Polish is equative comes from the fact that it is banned from sentences with AP or PP predicates, where again only the lexical verb 'be' is allowed.

(19) a. * Jan to [$_{AP}$mądry]
Jan DEM clever
'John is clever.'
b. Jan jest mądry.
Jan is clever
'John is clever.'

(20) a. *Jan to [$_{PP}$pod mostem]
Jan DEM under bridge
'John is under the bridge.'
b. Jan jest pod mostem.
Jan is under bridge
'John is under the bridge.'

Furthermore, copular sentences involving the Determiner Copula *to* are reversible; hence the alternation between (21a) and (21b):

(21) a. Mój najlepszy przyjaciel to Jan.
my best friend DEM Jan
'John is my best friend.'
b. Jan to mój najlepszy przyjaciel.
Jan DEM my best friend
'My best friend is John.'

I assume here a fairly straightforward analysis of Equatives, on which they involve a small clause constituent composed of two Noun Phrases.[5]

(22) [$_{TP}$ T^0 [[$_{SC}$ DP$_1$ DP$_2$]]

I also assume, following the insight of Moro (1997) that in a small clause of the kind given in (22) either of the two Noun Phrases can raise out of the small clause into [Spec,T] position.[6] Thus, underlyingly both (21a) and (21b) involve the same structure, given in (23).

(23) [$_{TP}$ T^0 [$_{SC}$ [$_{DP1}$ Jan] [$_{DP2}$ mój najlepszy przyjaciel]]]
Jan my best friend

---

[5] The assumption that there are equative small clauses, while not uncontroversial, is not unprecedented. See Heycock and Kroch 1998 for relevant discussion.

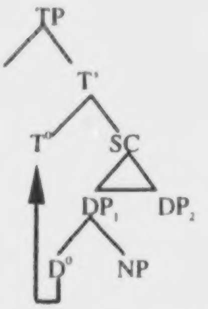
[6] I differ from Moro 1997 in that the raising of either noun phrase out of the small clause yields an equative statement.

If DP_1 raises, we get a canonical structure (24a), and if DP_2 raises we get an inverse structure (24b):

(24) a. $[_{TP}$ Jan$_i$ T^0 $[_{SC}$ $[_{DP1}$ $t_i]$ $[_{DP2}$ mój najlepszy przyjaciel]]]]
Jan my best friend
b. $[_{TP}$ Mój najlepszy przyjaciel$_i$ T^0 $[_{SC}$ $[_{DP1}$ Jan] $[_{DP2}$ $t_i]$]]]
my best friend Jan

Note that the Determiner Copula *to* is absent in an underlying structure. This raises the obvious question of how to account for its presence in the surface representation (cf.(21a-b)). The suggestion that I would like to make here is that Determiner Copulas are derived by means of feature movement: a D feature of the Determiner heading a Noun Phrase adjacent to T^0 (in the case at hand DP_1) undergoes head movement to T^0, as schematized in (25). This results in the presence of D^0 element in T^0, which is spelled out as a Determiner Copula *to*.

(25)



The immediate question that arises here is what motivates this D^0 to T^0 feature raising. I believe the answer follows from a very general property of equative statements, i.e. the requirement that the T^0 position be lexically filled. Thus, even in languages like Russian or Hebrew, which allow null copulas in predicational statements (26), null copulas are banned from equative statements, which require a demonstrative or a pronominal element in the T^0 position (33) (Rapoport 1987, Carnie 1995).

(26) a. Ivan - durak *Russian*
Ivan fool
'Ivan is a fool.'
(27) a. Moj xorosij drug *(eto) Ivan.
my good friend DEM Ivan.
'My good friend is Ivan.'

Head movement of the kind schematized in (25) is only one of the strategies languages use to satisfy this requirement. Naturally,languages like English use a different strategy. However, even in English we can see that the T^0 position in equative statements has to be filled. This is illustrated by the contrast in grammaticality between the a and b examples in (28-29).

(28) a. *I proved the King be that man over there. (Rapoport 1987)
b. I proved the King to be that man over there.
(29) a. I find David to be the King.
b. *I find David be the King.

4 Light-Headed Relatives

The analysis I develop in this section for Light-Headed Relatives essentially assimilates them to Equatives. We have seen in Sections 2 and 3 that both Light-Headed Relatives and Equatives exhibit a rather nonstandard use of demonstrative elements. This, I believe, reflects a deeper parallelism in structure, and suggests that Light-Headed Relatives also involve a small clause structure. This time, however, the small clause, instead of being composed of two Noun Phrases is composed of two clauses, as shown in (30).

(30) $[_{TP}\ T^0\ [_{SC}\ CP_1\ CP_2]\ ]$

Just as in the case of Equatives, either of the two constituents comprising the small clause can raise out of the small clause to [Spec,T]. If CP_1 raises, we get a canonical Light-Headed Relative (31a). If CP_2 raises, we get an inverse Light-Headed Relative (31b).

(31) a. $[_{TP} CP_1\ T^0\ [_{SC}\ t_1\ CP_2]\ ]$
b. $[_{TP} CP_2\ T^0\ [_{SC}\ CP1\ t_2]\ ]$

Consider first the derivation of a canonical Light-Headed Relative given in (32a). Underlyingly, it involves a null copula selecting a small clause constituent composed of two CPs: CP_1 *Spiewam wtedy* 'I sing then' and CP_2 *Maria śpiewa kiedy* 'Mary sings when' (32b).

(32) a. Spiewam wtedy kiedy Maria śpiewa.
I-sing then when Maria sings
'I sing when Mary sings.'
b. $[_{TP}$ T^0 $[_{SC}$ $[_{CP1}$ śpiewam wtedy] $[_{CP2}$ Maria śpiewa kiedy]]]
I-sing then Maria sings when

The first step in the derivation involves movement of the two pronominal elements, a wh-word *kiedy* 'when' and a D-word *wtedy* 'then' to the specifier positions of their respective CPs.

(33) $[_{TP}$ T^0 $[_{SC}$ $[_{CP1}$ wtedy$_1$ śpiewam t$_1$] $[_{CP2}$ kiedy$_2$ Maria śpiewa t$_2$]]]
then I-sing when Maria sings

The next step involves the movement of the D feature of the D-word *wtedy* 'then' to T^0, pied-piping the entire XP. This movement is analogous to the movement of a D feature to T^0 in equative statements (cf. 25); in both cases it satisfies the requirement that the T^0 position be lexically filled.

(34) $[_{TP}$ $[_{T'}$ wtedy$_1$ $[_{SC}$ $[_{CP1}$ t'$_1$ śpiewam t$_1$] $[_{CP2}$ kiedy$_2$ Maria śpiewa t$_2$]]]]]
then I-sing when Maria sings

The final step is the remnant movement of the CP$_1$ to [Spec, T].

(35) $[_{TP}$ $[_{CP1}$ t'$_1$ śpiewam t$_1$]$_1$ $[_{T'}$ wtedy$_1$ $[_{SC}$ $[_{CP1}$ t$_1$] $[_{CP2}$ kiedy$_2$ Maria śpiewa t$_2$]]]]]
I-sing then when Maria sings

The result is a canonical Light-Headed Relative given in (32a) above.

As suggested above, this general line of thought extends in an interesting way to Correlatives, which are inverse Light-Headed Relatives. Consider the following derivation:

(36) Kiedy Maria śpiewa wtedy śpiewam
when Maria sings then I-sing

(37) a. $[_{TP}$ T^0 $[_{SC}$ $[_{CP1}$ śpiewam wtedy] $[_{CP2}$ Maria śpiewa kiedy]]]
I-sing then Maria sings when
b. $[_{TP}$ T^0 $[_{SC}$ $[_{CP1}$ wtedy$_1$ śpiewam t$_1$] $[_{CP2}$ kiedy$_2$ Maria śpiewa t$_2$]]]
then I-sing when Maria sings

c. $[_{TP}$ $[_{T'}$wtedy$_1$ $[_{SC}$ $[_{CP1}$ t'$_1$ śpiewam t$_1$] $[_{CP2}$kiedy$_2$ Maria śpiewa t$_2$]]]]
then I-sing when Maria sings
d. $[_{TP}[_{CP2}$kiedy$_2$ Maria śpiewa t$_2$]$_i$ wtedy $[_{SC}[_{CP1}$t'$_1$śpiewam t$_1$] $[_{CP2}$t$_i$]]]
when Maria sings then I-sing

The derivation of a Correlative parallels that of a Light-Headed Relative up to the point involving the raising of the CP out of the small clause; the first three steps are the same in the two cases (compare (37a-c) to (33-35)). The sole difference between Light-Headed Relatives and Correlatives lies in which of the two CPs undergoes raising out of the small clause. In the case of a Light-Headed Relative it is CP$_1$ that raises out of the small clause (the matrix CP), whereas in the case of a Correlative it is CP$_2$ (the relative CP).

To summarize, I have argued for an analysis of Light-Headed Relatives which structurally assimilates them to Equatives. In the next section, I discuss the implications of this analysis for the interpretation of Light-Headed Relatives.

5 Consequences

5.1 Motivation for Movement

In the final section, I address some of the questions this proposal raises. Recall that the derivation of both a canonical Light-Headed Relative and a Correlative involves the raising of a CP out of a small clause into the specifier of T^0. A fairly straightforward way to motivate this movement is to assume that it is forced by the EPP feature of T^0. The possibility for any of the two CPs to satisfy the EPP feature could quite plausibly be thought of as being related to other properties of the Slavic languages, namely free word order and the differences in information structure associated with different word orders.

It has been long observed that Slavic word order marks the division of a sentence into Topic/Focus or Theme/Rheme structure. The term Focus here refers to Informational Focus in Kiss's 1998 sense; crucially to be distinguished from Quantificational or Identificational Focus. Theme is standardly defined as what is given or already known from the preceding utterance or what is taken to be the point of departure, and Rheme as what is new or what is the primary goal of the communication. I assume here, not uncontroversially, that in the unmarked case the entire sentence is the Focus or Rheme. Furthermore, following Fowler 1987, I assume the existence of a rule of thematic extraction which can take any sentential constituent and move it out of the Focus domain. Thematic extraction in current terminology could be thought of as being movement to satisfy the EPP feature of Tense. Whatever constituent moves to check off this EPP feature ends up being interpreted as Theme.

A common test used determine the partitioning of a sentence into Theme/Rheme is the Wh-Question test, where what provides the response to a wh-question is the Focus.

Consider in this light the difference between a Light-Headed Relative and a Correlative. A Light-Headed Relative is an appropriate response to a wh question *When will you sing*? The relative CP *kiedy Maria zaśpiewa* 'when Mary sings' is thus the Focus and the matrix CP *wtedy zaśpiewam* 'I will sing then' is the Theme. On current assumptions this shows that it must have moved out of the Focus domain. This is precisely what happens during the derivation of (38); the matrix CP moves out of the small clause to [Spec, T] position (cf.(35) above).

(38) A: Kiedy śpiewasz?
when you-sing
'When do you sing?'
B: Spiewam wtedy [$_{sc}$kiedy Maria śpiewa]
I-sing then when Maria sings
'I sing when Mary sings.'

By the same test, a Correlative is an appropriate response to a wh question *What will you do when Mary sings*?, which suggests that in this case the matrix CP *zaśpiewam* 'I will sing' is the Focus and thus the relative CP *kiedy Maria zaśpiewa* 'when Mary sings' must have moved out of the Focus domain. Again, this is exactly what happens; in this case it is the relative CP that moves out of the small clause to [Spec,T] (cf. (37d) above).

(39) A: Co robisz kiedy Maria śpiewa?
what you-do when Maria sings
'What do you do when Mary sings?'
B: Kiedy Maria śpiewa wtedy [$_{sc}$śpiewam]
when Maria sings then I-sing
'When Mary sings, I sing.'

5.2 Interpretation of Light-Headed Relatives

Another question concerns implications of this analysis for the semantics of Light-Headed Relatives. The semantics I would like to suggest for both Light-Headed Relatives and Correlatives essentially involves equation between two entities. Consider the Light-Headed Relative given in (40a) and its structure in (40b). Its meaning can be paraphrased as 'The thing that I will sing is/equals to the thing that Mary will sing' (40c).

(40) a. Spiewam to co Maria śpiewa.
I-sing DEM what Maria sings
'I sing what Mary sings.'
b. $[_{TP}$ T $[_{SC}$ $[_{CP1}$ to śpiewam] $[_{CP1}$ co Maria śpiewa]]
DEM I-sing what Maria sings
c. ιy [I sing y] = ιx [Mary sings x]

How do we arrive at the interpretation in (40c)? As far as the equation relation goes, for now I simply assume that it can come either from the nature of the copula itself or, alternatively, from the nature of the small clause.

The two CPs comprising the small clause are interpreted as free relatives. With respect to the semantics of free relatives, I follow Jacobson 1995 and Rullmann 1996 and assume that they denote maximal individuals (MAX operator in Rullmann's system and iota operator in Jacobson's system).

(41) a. ιy [I will sing y]
b. ιx [Mary will sing x]

5.3 Further Questions

The analysis presented in this paper establishes a link between D elements in Equatives and D elements in Light-Headed Relatives. This link, however, cannot be totally straightforward, since Light-Headed Relatives exist not only in languages that have Determiner Copulas. Crosslinguistically, the range of languages that allow Light-Headed Relatives seems to be much wider than the range of languages that have Determiner Copulas. Languages such as Greek, German or Dutch do not use Determiner Copulas in equative statements but nevertheless allow Light-Headed Relatives (Sabine Iatridou, personal communication). At present, I am not aware of any language that has Determiner Copulas but does not allow Light-Headed Relatives. For the time being, I simply assume that in languages like Greek or German, Determiner Copulas are banned for independent reasons. A reasonable hypothesis worth investigation is to link the availability of Determiner Copulas in Equatives to the availability of null copulas in predicational statements. I leave such typological issues for further research.

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Semantically Charged Syntax and the Construction of Meaning

Kristin M. Eide and Tor A. Åfarli

Bowers (1993) proposes that the subject–predicate relation is formed by a predication operator (op.), i.e. a function from a property to a propositional function or predicate. This operator heads an independent functional predication projection, as shown for instance in (1a), and it is also lexicalized in certain cases, for instance as in (1b).

(1) a. ...make [PrP John [Pr' [Pr op.] [AP crazy]]]
    b. ...regard [PrP John [Pr' [Pr op./as] [AP crazy]]]

In this paper we will first show, mainly using data from Norwegian, that several types of element may lexicalize the predication operator (section 1). Next, we investigate how meaning is constructed – i.e. how a given projection is determined as to its syntactico-semantic content – in a situation where a semantically uniform operator like the predication operator is variously lexicalized by different visible elements, each with its own specific amount of inherent content (section 2). We then go on to argue that a given visible element is often multifunctional in that it may potentially lexicalize different types of functional operator (section 3). Last, we propose that syntactic representations should be construed as structured objects essentially consisting of functional operators that are made visible by various types of element by insertion and movement, thus suggesting a program for a semantically charged syntax (section 4).

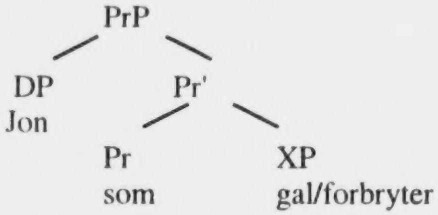
1 Lexicalization of the Predication Operator

The Norwegian counterpart to *as* in structures like (1b) is *som*. Thus, we find structures like (2), where we assume that *som* is the lexicalization of the predication operator.

(2) a. ...anse [Jon [som gal]].
    ...consider Jon as crazy
    '...consider Jon crazy.'
  b. ...anse [Jon [som forbryter]].
    ...consider Jon as criminal
    '...consider Jon a criminal.'

The bracketed part of the strings in (2) has the representation shown in (3), where XP is the property phrase which is turned into a predicate by the predication operator lexicalized by *som*.

(3)



In other words, the constituents under consideration here are small clauses, expressing propositions constituted by a predicate (Pr') and a predication subject (DP), which is indeed in accordance with the semantic intuition that we have regarding these constituents. Additional motivation for the claim that we are here dealing with small clauses is the fact that these constituents may contain an expletive or expletive-like subject, as shown in (4).[1]

(4) a. ...anse [det [som altfor kaldt for skigåing i dag]].
...consider it as much-too cold for skiing to day
b. ...anse [det [som uheldig at Jon vil komme]].
...consider it as unfortunate that Jon will come

Following Eide (1998a), Eide (1998b), Eide & Åfarli (1999) we furthermore assume that the copula may lexicalize the predication operator in environments where a verbal head is required, which amounts to saying that the particle *som* is a non-verbal counterpart to the copula. The feature that separates the copula from *som* is exactly the verbal feature [+V] (and thus the capability of supporting tense or other verbal morphology); in all other respects the copula-expression and the *som*-expression seem to pattern together: regarding case, agreement and type of complement selected, see the discussion in Eide & Åfarli (1999: 164 ff.). Generally, the structural and semantic similarities between copula-expressions and *som*-expressions are indicated by the fact that a small clause headed by the particle *som* can as a rule be paraphrased as a full clause with the particle replaced by the copula.

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[1] *Det* in (4b) is proably not an expletive subject, but a cataphoric subject referring to the *that*-clause. Nevertheless, the example clearly indicates the clause-like structure of the *som*-expression.

(5) Vi anser [det [som et faktum at hun kommer]] => Vi anser at [det [er
et faktum at ...]]
we consider it as a fact that she comes => we consider that it is
a fact that ...

Thus, we conclude that in copula constructions the copula lexicalizes the predication operator; i.e. copula constructions have the structure (3) with *som* replaced by the copula.

However, it seems that the predication operator can have still other lexicalizations. Specifically, we propose that *til* 'to' in resultative small clauses like (6a) and *for* 'for' in small clauses like (6b) are lexicalizations of the predication operator. As such, we refer to *til* and *for* as prepositional predication particles (see also Eide 1998b: 71 f.; Eide & Åfarli 1999: 170).

(6) a. ...gjøre [Jon [til forbryter]].
...make Jon to criminal
'...make Jon into a criminal.'
b. ...ta [Jon [for kelner]].
...take Jon for waiter
'...take Jon for being a waiter.'

Indication that this is the correct analysis is the fact that small clauses headed by *til* or *for* (like small clauses headed by *som*) may contain an expletive-like subject, indicating that the bracketed parts in (6) are clausal expressions, cf. (7).

(7) a. ...gjøre [det [til noe skittent at jeg sa dette]].
...make it to something dirty that I said this
'...make it into something dirty that I said this.'
b. ...ta [det [for gitt at jeg sa dette]].
...take it for given that I said this
'...take it for granted that I said this.'

Notice also that the nominal complements in (6) are bare, indicating that the complement is the property phrase of a small clause (like e.g. in (2b)), not the referential complement of a preposition. In the latter case, being a referential argument, the noun phrase is as a rule not bare:

(8) a. Vi snakket til en forbryter / forbryteren / *forbryter.
we talked to a criminal / criminal-the / criminal
b. Vi gir hundre kroner for en kelner / kelneren / *kelner
we give hundred crowns for a waiter / waiter-the / waiter

Like *som*, the prepositional predication particle *til* seems to have a verbal counterpart, namely *bli* 'become'. This is illustrated by the following Swedish sequence from Selma Lagerlöf´s famous novel about Nils Holgersson:

(9) Pojken kunde rakt inte förmå sig att tro, att han hade blivit förvandlad
till tomte [...] om jag väntar ett par ögonblick, så *blir* jag nog män
niska igen.
'The boy could not get himself to believe that he had been turned into a
goblin [...] if I wait just a couple of moments, then I will surely be
come a human being again.'

We propose that what distinguishes *til* from *som* is an inchoative/directional feature. Similarly, we assume that a corresponding inchoative/directional feature distinguishes *bli* 'become' from *være* 'be'.

2 The Content of the Pr-Projection

The underlying predication operator contributes what might be called 'predicative content' to the projection it heads. However, the content of the projection as a whole is also partly constituted by the inherent content of the element that lexicalizes the operator. In cases where the operator is lexicalized by *som* or the copula, the semantic contribution of the lexical element seems to be quite small, and the element is little more than a structural marker of the underlying semantic operator.[2]

However, this is not so in cases where *til* lexicalizes the operator. In such cases, the operator and the lexical element each contributes significantly to the apprehended meaning of the projection. As suggested in the previous section, the particle *til,* which otherwise clearly functions as a preposition, carries an inchoative/directional meaning, and when this element is inserted into the head position of a PrP, the result is the amalgam [pred.op + incoative/directional]. This yields a resultative reading of the small clause PrP.

However, the apprehended meaning of a projection is not exhausted by the content of the operator and the content of the visible element. We also claim that the *complement* of a head typically plays a crucial role in determining the reading of the head itself, and its projection (see Pustejovsky 1995 for a closely related idea). This point of view implies a dynamic interpretation of the principle of compositionality (Frege´s Principle), i.e. the principle that the meaning of the whole is a function of the meaning of the parts and their mode of combination.

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[2] There are nevertheless some subtleties: *som* yields a more hypothetical reading than does *være* 'be'. Thus, *...se Jon som spøkelse* '...see Jon as a ghost' differs from *...se Jon være spøkelse* '...see Jon be a ghost' in that the former is potentially hypothetical while the latter is not.

The principle of compositionality is usually construed as what we will call a principle of static compositionality, characterized in (10), but we propose instead that the appropriate notion is a notion of dynamic compositionality, as stated in (11).

(10) *Static Compositionality (e.g. in model-theoretic semantics):*

> "[T]he parts" referred to in the statement of Frege's Principle must be the syntactic constituents of the expression in question. Moreover, the meanings of those constituents must enter into the meaning of the whole expression *in a fixed way,* determined once and for all by the semantic rule corresponding to the syntactic rule by which those constituents were joined. Dowty & al. (1981: 9)

(11) *Dynamic Compositionality:*

> The meanings of the parts enter into the meaning of the whole expression, not in a fixed way, but such that the meaning of a given constituent is *affected* by the meaning of the constituents with which it combines.

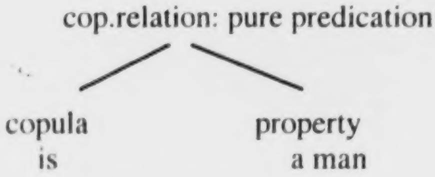
To show how this works, we will use the notion of dynamic compositionality to explain the different readings associated with the copula, namely the pure predicational reading, the equative reading, the existential/spatial reading, and the temporal reading, see (12).

(12) a. Clark Kent is a man. (pure predicational reading)
b. Clark Kent is Superman. (equative reading)
c. Clark Kent is outside. (existential/spatial reading)
d. Superman is tomorrow. (temporal reading)

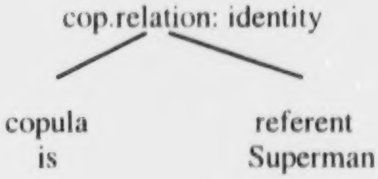
In fact, the verb is frequently called the copula in (12a) only, but our claim is that (12) contains four occurrences of the same verb, the different readings of the verb being due to the semantic nature of the complement.

In (12a) the complement of the copula is *a man,* a phrase that denotes a property. The predication operator, lexicalized by the copular verb, turns this phrase into a predicate. The relation is depicted in (13). In (12b) the complement of the copula is a phrase denoting a referent, and the only likely copular relation between this referent and the subject referent is the relation of identity, depicted in (14). In (12c) the complement of the copula is a phrase denoting a place, and the verb gets its spatial reading via interaction with the spatial meaning of the complement, depicted in (15).

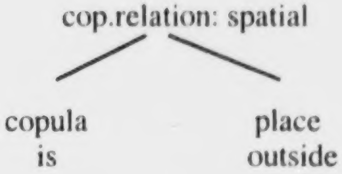
(13)



(14)



(15)



Thus, the apprehended meaning of the copula in a given sentence is determined by three separate, but interacting components: (a) the meaning of the underlying predication operator; (b) the specific inherent meaning of the lexical element making the operator visible; (c) the dynamic meaning formed by the interaction of the copula with its complement. Generalizing this picture, we assume that these three components are always potentially relevant in determining the syntactico-semantic content of a given projection.[3]

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[3] Notice that the configurational complement of the predication operator lexicalized by *is*, is a property-denoting phrase in (12a) only. Thus, (12b-d) do not seem to instantiate the scheme in (3), where the complement denotes a property that is input to the predication operator (recall that the predication operator is a function from a property to a propositional function). The problem is that (12b-d) seemingly do not contain a property element that can be input to the predication operator. A similar kind of problem regarding the instantiation of the predication operator by main verbs (cf. section 4), is discussed in Eide & Åfarli (1999: 177). There we in essence propose as a possibility that in cases where a property element cannot be identified by a constituent in the structure, a function is imposed on the lexical element, whose output is a property. In present terms, that function is imposed as part of the meaning of the copular verb by dynamic compositionality. For example, in (14)

Now, turn to (12d), repeated here as (16).

(16) Superman is tomorrow. (temporal reading)

In this case, dynamic compositionality yields a temporal reading of the copula, as indicated. However, this example is particularly interesting because it shows the importance of encyclopedic knowledge in the determination of the semantics of a given string. In (16), the complement of the copula is a phrase denoting a point in time. Therefore, the phrase consisting of the copula and its temporal complement yields the reading *takes place tomorrow*. But in combining this relation with the subject *Superman*, our knowledge of the world kicks in and tells us that the word *Superman* in this case cannot possible denote the referent Superman. A referent couldn't possibly be something that takes place tomorrow – *events* take place, not objects or persons. As a consequence, the straightforward referent interpretation is very unlikely and is normally rejected. The only way we can make sense of this sentence is to assume that *Superman* refers to an event, for instance the event of showing the film about Superman.

This particular example can serve as a reminder that language is never used in a vacuum, but for communicative purposes in a given discourse, against a vast background of encyclopedic knowledge (knowledge of the world). This knowledge narrows down the list of possible meanings relevant in a given context, and turns communicative use of language into more than a fairly educated guess.

3 Multifunctionality and Support of Operators

In section 1, we saw that the predication operator can occur in various disguises in Norwegian: the particle *som*, the copular verbs *være, bli*, and the prepositional predication particles *til, for*. Given the basic predicational content of the projection headed by these elements, this variation suggests – as we have in fact been assuming – that the syntactico-semantic substance resides, not primarily in the supporting element, but in the abstract operator made visible by the element.

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the underlying predication operator is a function from a property to a propostional function. However, *Superman* denotes an entity. The content imposed on the copular verb can be construed as a function from an entity to a property, which, when applied to the entity-denoting complement, yields a property as output. That (abstract) property in turn is input to the predication operator, yielding a propositional function, i.e. a predicate, instantiated by *is Superman*.

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The assumption that the content of a functional projection is not first and foremost derived from the visible element filling the head position, is further corroborated by the examples in (17), showing structures containing Old Norse relative clauses (from Iversen 1972: 153).

(17) a. kringla heimsins sú **er** mannfólkit byggir.
'the world that men live in.'
b. þau helgu orð **en** í bókinni váru.
'those holy words that were written in the book.'
c. gera hús þar **sem** eigi hafi fyrr verit.
'build a house where there had been no house before.'
d. þeir allir, **at** þau tíðindi heyrðu.
'everybody that heard these news.'

As these examples show, the complementizer position (C-position) of relative clauses in Old Norse is made visible by various subjunctions, but as far as we can tell, there is no reason to assume that the C-projections of these clauses have different content.

Now, if it is really the case that the visible element marking a functional head position should be viewed primarily as a positional marker, we should in fact expect that the very same element should possibly be able to make *different* underlying semantic elements or operators visible. This is so since the sparse inherent content that a given visible functional element often has, is compatible with having different syntactico-semantic roles. This expectation seems to be fulfilled.

Thus, *som* may be used e.g. as a subjunction or comparative particle in addition to its use as a predication particle, see (18):

(18) a. Vi spør hva **som** har skjedd. (subjunction)
we ask what *som* has happened
'We ask what has happened.'
b. Han snakker **som** ei kvinne (snakker). (comparative particle)
he speaks *som* a woman (talks)
'He speaks like a woman.'
c. Han snakker **som** sjef for dette firmaet. (predicational particle)
he talks *som* boss for this firm
'He talks as the boss of this firm.'

The syntactico-semantic function or content of *som* is different in each instance, as indicated in the parentheses, and also by the translations (in (18a, b) *som* does not lexicalize a predication operator). Likewise, *være* 'be' may be used as an ordinary auxiliary verb in addition to its use as a copular verb, and *til* 'to' and *for* 'for' may function as ordinary prepositions, in which case they do not lexicalize a predication operator.

That is, the very same element appears to be capable of being "recycled" in different syntactico-semantic roles, possibly to instantiate different operators. In other words, overt forms are in principle *multifunctional*. Assuming that syntactic elements generally make functional operators visible by "supporting" them,[4] and furthermore assuming that the content of any functional projection is at least partly constituted by the content of the operator and partly by the content of the supporting element or marker, it follows that the supporting element always *underdetermines* the content of the projection it heads.[5]

Summarizing, the fact that not only the same functional form may mark different functional projections, but also that *different functional forms may mark the same functional projection*, indicates that the head of a given functional projection is an abstract syntactico-semantic item, and that insertion of an overt element in that position is not what gives the position its syntactico-semantic identity. Rather, the overt element marks, supports, or makes visible a position that has already got a syntactico-semantic identity.[6]

4 The Operator Structure as the Syntactico-Semantic Backbone of the Sentence

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[4] Much in the same way as English *do* is thought to support an underlying tense element in so-called *do*-support, see e.g. Pollock (1989), Chomsky (1995: 139-140).

[5] Consider the alternative. If the syntactico-semantic function or content is determined by inherent properties of the element actually filling the head position, the multifunctionality witnessed in e.g. (18) is only possible if the overt element is polysemous, so that there are at least three different *som*. However, it seems to us that polysemy is not a solution, but rather a problem to be solved, and we would like to propose that our analysis suggests a fruitful approach to that problem. According to that analysis, polysemy is an epiphenomenon, derived from the fact that the same form may be used to mark different syntactico-semantic head positions, the content in each case being to a considerable degree determined by the underlying semantic element or operator.

[6] Interestingly, we have become aware that a similar conception is found in the Distributed Morphology approach. Thus, in Harley & Noyer (1999: 7) we read: "Theories endorsing Separationism are attractive because (a) they allow similar syntactico-semantic forms to be realized in quite different ways phonologically, and (b) they permit polyfunctionality of phonological expressions: a single piece [...] might correspond to a set of distinct and unrelated syntactico-semantic functions." See also Marantz (1997), Halle & Marantz (1993).

Up to now we have been mainly concerned with the predication operator and its lexicalization, although we have suggested that there exist other functional operators, as well. In this section, we would like to pursue the general idea that the syntactic functional projections of a clause are the projections of underlying operators, which are in turn supported by visible items. Specifically, we propose that a syntactic string is the derivative visible expression of a rudimentary I(nternalized)-semantic representation constituted by structurally ordered operator tokens. This rudimentary operator structure can be said to constitute the basic underlying logical form of the sentence.

However, before we discuss the syntactic instantiation of the underlying operator structure in more detail, we would like to sketch how it relates to the over-all semantics expressed by the clause. In fact, it has been proposed that language has no semantics at all, i.e. the claim is that the meaning of clauses is only more or less indirectly related to our general cognitive representations of meaning – our general conceptual structure (Fodor 1998: 9; Jackendoff 1983: 95). Such a view is also expressed in the following quotations from Fauconnier (1994: xx-xxi).

(19)Sentences bring together, in one linguistically homogeneous form, heterogeneous and incomplete information as to the cognitive construction to be performed within a context for the purpose of constructing meaning. Meaning ensues when such operations are performed, but is not itself directly assignable to sentences.

We accept the idea that sentences in some sense function as triggers for elaborate meaning construction or "backstage cognition", to use a phrase employed by Fauconnier (1994: xvii). However, we go against the idea that natural language has no semantics. If that were the case, it seems to us that it would be impossible to get some particular meaning-related "backstage cognition" started at all. The sentence must have *some* amount of semantics, however rudimentary, in order to trigger some *particular* meaning construction, i.e. a given sentence does not trigger *any* thought; it triggers a *corresponding* thought. In fact, we read the quotation from Fauconnier in (19) as a statement to this effect.

Our proposal is that the back-bone of this "information" is the operator structure alluded to previously. Moreover, we assume that this rudimentary operator structure is related to the syntactic structure of the sentence in a homomorphic fashion. In that respect we adopt as our general point of view the framework of selective Grammar Semantics developed in Bouchard (1995), in particular the principle of "Full Identification" which says that every (morpho-)syntactic formative of a sentence must have a corresponding element in the semantic representation, and that every formative of a semantic representation must be identified by a (morpho-)syntactic element in the sentence, which is associated with that representation (Bouchard 1995: 22). In other words, the grammar semantics directly *expressed* by a clause must be distinguished from the semantics that *results* from the clause.

On the assumption that syntactic structure expresses the operator structure in a homomorphic fashion, our method will simply be as stated in (20):

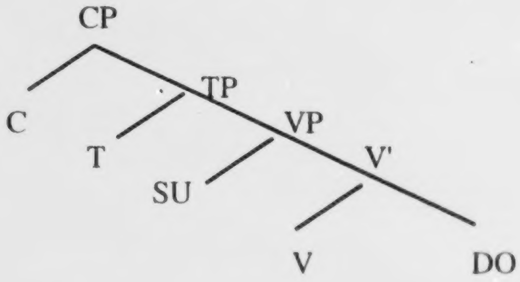
(20) To find the I-semantic representation of a sentence, identify the syntactic elements and relations and find their semantic correlates.

Notice that we are committed to the view that any *visible* syntactic element/relation has a corresponding semantic element/relation. However, we will still leave room for semantic elements/relations that are not *directly* expressed in overt syntax.[7]

Let´s see how this approach works. The consensus on the basic syntactic structure of clauses in the last fifteen years or so is roughly that they consist of at least two functional projections – a C-projection and an I- or T-projection – on top of the basic lexical VP, which expresses the basic proposition. There are several variations on this theme, with various proposals regarding the number and order of functional categories, the most recent Chomskyan analysis assuming a so-called light verb projection on top of the VP (Chomsky 1995: 315-316). However, for reasons that will be mentioned below we will assume the simple CP-TP-VP structure depicted in (21) for a clause employing a transitive verb.

We propose that the C-projection and the T-projection have the operator correlates shown in (22), which, to use a metaphor, may be seen as semantic seeds that the syntactic structure grows out of.

(21)



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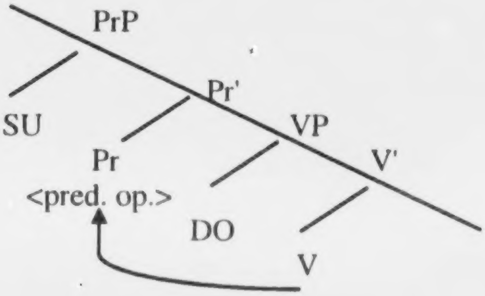
[7] We assume that the number and types of functional projections that languages employ may vary from language to language, and even from clause type to clause type within the same language, see Åfarli (1995), Thráinsson (1996) for motivation.

(22) a. Semantic correlate of C: basic force operator (interrogative, imperative, declarative), cf. Stenius (1967), Kitahara (1997: 9), Elvsaas (1998).
b. Semantic correlate of T: tense operator (e.g. Pollock 1989)

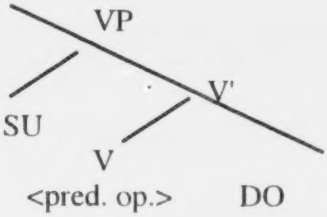
What about the lexical V-projection? Given our earlier adoption of Bowers (1993) regarding the analysis of secondary predication (i.e. non-finite predication), it seems natural to adopt Bowers´ analysis of the nexus of the full clause, as well. Bowers argues that the verb phrase is non-unitary with the basic VP being the complement of a Pr-projection. The main verb obligatorily lexicalizes the predication operator by raising from V to Pr in a (partial) representation like (23).

(23)



However, contrary to Bowers´ non-unitary analysis of the verb phrase and in keeping with our analysis of the copula, we have argued elsewhere (Eide & Åfarli 1999: 171ff.) that the predication operator is directly lexicalized by the main verb, so that the V-projection may be said to be a joint projection of the predication operator and the main verb. Thus, we claim that the structure of the verb phrase is not as in (23), but rather as in (24).[8]

(24)



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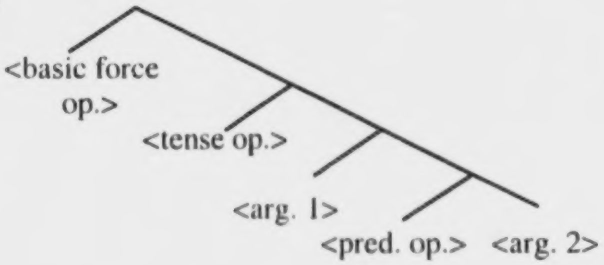
[8] The projection of a predication operator lexicalized by a (main) verb could be labelled either V or Pr. We have chosen V since intuitively the verbal content of the verb (Theta-properties etc.) is at least as important for the nature of the projection as is the predication operator.

In other words, our analysis amounts to a chunking of the attributive content of the verb and the predication operator.[9]

On the basis of the above reasoning, we hypothesize that the syntactic structure shown in (21) corresponds to, i.e. is the visible counterpart to, the I-semantic structure shown in (25):

(25)



Consider how the functional operator tokens in (25) are made syntactically visible. We assume that each operator has a designated slot for an overt element that makes the operator visible, so one way of making for instance the predication operator visible is for *som* or a verb to fill that slot. Technically, we adopt the device proposed in Rizzi & Roberts (1996: 106) whereby incorporation is construed as substitution into a subcategorized slot of the head. Thus, "where an incorporation trigger X^0 has the feature [+Y^0 __], this means that the slot for Y^0 is base-generated within X^0, triggering substitution of Y^0..." (ibid.). In the predication operator case, *som* or a verb is substituted into the subcategorized slot of the predication operator.

Next, consider the tense operator. The tense operator may be made visible by the insertion of an overt particle into the visibility slot. This is the strategy typically employed in Creole languages, where specific particles mark tense, see e.g. Muysken (1981). A sample of such tense particles in some Creole languages is shown in (26):

(26)

Hong Kong Macanese	*ja*	Jamaican	*ben*
Haitian	*te*	Negerhollands	*ha*

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[9] This chunking is otherwise motivated on grounds of processing efficiency, see Jackendoff (1983: 125), Bouchard (1995: 95). Notice also that our proposal amounts to a restoration of the Port Royal idea that a given verb is constituted by a concealed copula (expressing the predication operation) and an attribute (expressing the conceptual content of the verb), cf. Buroker (1994: 14ff.) and Arnauld & Nicole (1996 [1662]: 78ff.).

In other languages, tense is marked by a tense affix on the verb, which we take as indication that the verb has been raised to the tense operator. Thus, in such languages the tense operator is made visible by movement (analyzed as a complex operation involving insertion as a subpart).

Similar reasoning applies to the C-projection, assuming it be the projection of the basic force operator. The force operator is typically made visible by verb movement in V2-languages, as shown in the Norwegian examples in (27).

(27) a. Hva$_j$ **har**$_i$ Jon t_i sett t_j? (wh-question)
what has Jon seen
'What has Jon seen?'
b. **Se**$_i$ (du) t_i dette! (imperative)
see (you) this
'See this!'

In sum, there are two main mechanisms that language uses to make a functional operator visible. Either an element is directly inserted from the lexicon or an element is inserted from some other position in the structure (by movement). In other words, there are two main means of "supporting" a functional operator.

One interesting idea implied by this, is that movement is semantically driven, not feature driven as is assumed in current Minimalist syntax. That is, verb movement is "semantically" motivated in order to make functional operators visible (see Roberts & Roussou 1997 for a related idea). Thus, we want to reinterpret the feature driven movement (Last Resort, feature checking) assumed in Minimalist syntax as movement triggered by the need to fill the visibility slot of semantic operators. Roberts & Roussou (1997) note several problems with the mechanism of feature checking, among others that it introduces features into the derivation whose sole purpose is to be deleted, and that it requires the presence of the same feature twice. However, if movement (and insertion) is triggered by a general requirement (possibly subject to parametric variation) that the visibility slot of semantic operators is filled, these problems are eliminated. In fact, we see the Minimalist reinterpretation of movement as Attraction (Chomsky 1995: 297) as a step in this direction. This reinterpretation shifts the triggering factor from the lower, moved element to the upper element that the moved element is checked against, which in our analysis corresponds to a functional operator.

5 Conclusion

We have shown that the predication operator (Bowers 1993) is lexicalized by various overt elements in Norwegian (the predication particle *som*, copular verbs, prepositional predication particles, main verbs). Moreover, observing that the elements that may lexicalize the predication operator often have syntactico-semantic functions besides making the predication operator visible, we concluded not only that the content of a functional projection is primarily constituted by an abstract underlying element or operator, but also that the visible elements are possibly, even typically, multifunctional, often vastly underdetermining the functional projection they head. Generalizing that idea, we hypothesized that the syntactic structure is really the homomorphic instantiation of an underlying semantic structure consisting of an ordered array of operators such as a predication operator, a tense operator, and a basic force operator, to mention the minimum of operator types that we assume are present in finite main clauses in Norwegian. Thus, we in effect propose the outlines of a program for a semantically charged syntax with semantic operators rather than features (as in current Minimalist syntax) as the driving force for head insertion/movement.

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‘Punctuality’ and Verb Semantics

Stefan Engelberg

1 Introduction

Whether verbs have to be marked as punctual vs. durative has been a controversial issue from the very beginnings of research on aktionsarten in the last century right on up to modern theories of aspectual classes and aspect composition. Debates about the linguistic necessity of this distinction have often been accompanied by the question of what it means for a verb to be temporally punctual.

In this paper I will, firstly, sketch the history of research on the punctual-durative distinction and present several linguistic arguments in its favor. Secondly, I will show how this distinction is captured in an event-structure-based approach to lexical semantics. Thirdly, I will discuss the extent to which a precise definition of the notions used in lexical representations helps avoid circular argumentation in lexical semantics. Finally, I will demonstrate how this can be done for the notion of ‘punctuality’ by clarifying the logical type of this predicate and relating it to central cognitive time concepts.

2 Evidence for Punctuality in the Lexicon

The notions of ‘punctuality’ and ‘durativity’ have been extensively employed in research on aspectuality, i.e., research on grammatical aspect, aktionsarten, Vendler classes and the like. Among the earliest approaches to these phenomena are theories on grammatical aspect, in particular the distinction between the classical Greek aorist stem and present stem and on the aspect system in Slavic languages. The perfective aspect in Greek and Slavic has often been described as ‘punctual’, the imperfective aspect as ‘durative’ (e.g. Schleicher 1855, Pott 1859, Curtius 1863). This approach has not proven very fruitful but it should be kept in mind that until the early twentieth century a distinction between grammatical aspect and lexical phenomena like aktionsart had not been made.[1]

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[1] Aspect is nowadays usually understood to be a grammatical category alongside others such as tense, mode, etc., which is paradigmatically applied to verb forms by means of inflection, derivation or stem formation, while aktionsart is taken to be a

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Little by little, phenomena more closely related to the lexical meaning of verbs entered into linguistic discussion.[2] Observations concerning the distribution of adverbials denoting a span of time go as far back as Romberg (1899). These adverbials (e.g., *in two hours*) usually combine with verbs denoting durative events with a result state (1)[3]. If combined with punctual change of state verbs they often sound odd (2), unless a preceding event can either be anchored in context as a reference point for the beginning of the interval (3), or is lexically presupposed. In (4), for example, it is presupposed that Rebecca had been moving towards the summit:

(1) Rebecca wrote the paper in six weeks
(2) ??Rebecca's vase broke in two minutes
(3) Rebecca pressed the button and the bomb exploded in two minutes
(4) Rebecca reached the summit in two hours

Two things should be noticed: Firstly, even if the interval denoted by the *in*-phrase is very short, the beginning of the interval seems to be anchored in some contextually salient event when the phrase is combined with a punctual verb. In (3) the beginning of the interval is the event when Rebecca pressed the button; the sentence is not interpreted in the sense that the explosion itself took three seconds. This is reflected by the fact that in these cases the *in*-phrase can be replaced by a PP headed by *after* (cf. Piñon 1997): (3) is equivalent to (5) but (1) is not equivalent to (6).

(5) Rebecca pressed the button and the bomb exploded after two minutes
(6) Rebecca wrote the paper after six weeks

Secondly, punctual verbs that *presuppose* a preceding durative event are characterized by the fact that punctual adverbials unambigously refer to the end of the event as in (7) while this is not the case with normal accomplish-

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lexical category derived from the lexical meaning of verbs and which - if it is related to specific morphemes at all - is expressed mainly by derivational affixes. The mingling of aspect and aktionsart phenomena in the last century was partly due to the emphasis that was put on the investigation of Gothic, where the morphem *ga-* reached a certain degree of grammaticalization as a prefix expressing perfectivity.

[2] Cf. Engelberg (1998:64ff) for a more detailed discussion of these phenomena.

[3] As is well known this does not hold if a bare plural or a mass noun occurs in object position: ??*she wrote papers / stuff in two weeks.*

ment verbs (i.e., verbs in which a durative event leading to a change of state is *implied* by the meaning of the verb) as can be seen in (8): If the verb is in the future tense, the adverbial always refers to the beginning of the whole event, and if it is in the past tense, it is likely to do so.

(7) Rebecca won / will win the race at five
(8) Rebecca cleaned up / will clean up her room at five

Durative adverbials have been used as a diagnostics for verbs semantics since Romberg (1899) and Streitberg (1900). These adverbials (e.g., *for two hours*) usually combine with non-resultative durative verbs (9). They may also combine with non-resultative punctual verbs, in which case the verbs receive an iterative interpretation as in (10). This even seems to hold when the temporal adverbial denotes an extremely short period of time (11):

(9) Rebecca jogged / was jogging for a couple of minutes
(10) Rebecca hit / was hitting him for a couple of minutes (← repeatedly)
(11) Rebecca hopped / was hopping for two seconds (← repeatedly)

Streitberg (1900) also noticed that punctual verbs do not occur as complements of aspectual verbs like *beginnen* 'to start' or *aufhören* 'to stop' as in (12). Again, this is possible if they can get an iterative interpretation as in (13), which is usually available for non-resultative punctual verbs:

(12) *The vase started / stopped breaking
(13) Jamaal started / stopped hopping (← repeatedly)

Another long standing puzzle has been the question why some verbs cannot occur in the progressive aspect. Leaving aside restrictions on stative verbs for the moment, an approximate solution might be the following: While all durative verbs allow the progressive form, for punctual verbs there are occurrence and interpretation restrictions. Firstly, such restrictions include that non-resultative punctual verbs are interpreted iteratively when they occur in the progressive (14). Secondly, punctual verbs that presuppose a preceding event occur in the progressive, as in (15), where it is presupposed that Rebecca participated in the race or was nearing the completion of her journey. In this case, the progressive sentence is related to the time of this preceding event. Finally, punctual verbs that do not belong to these two types

- especially those that lead to cognitive states - do not allow the progressive (16) (Engelberg 1998:74ff).

(14) Rebecca was pinching Jamaal / was hopping (← repeatedly)
(15) Rebecca was winning the race / was arriving
(16) ??Rebecca was noticing that / ??that was astonishing Rebecca

Other phenomena related to punctuality concern syntactic structures. Among these is a valence alternation between an accusative object and a PP headed by *an*. This alternation is restricted to verbs that refer to events that i) are non-punctual and ii) are followed by a result state; i.e., it is restricted to durative verbs (DUR) verbs that express a change of state (CS) like *schreiben* 'to write', *bauen* 'to build', *nähen* 'to sew', in contrast to punctual verbs (PCT) like *sprengen* 'to blast, to blow up', *brechen* 'to break', *knicken* 'to fold' (Engelberg 1994):

(17) Rebecca baute eine Hundehütte / an einer Hundehütte [DUR; CS]
approx.: 'she built / was building a doghouse'
(literally: "she built a doghouse / at a doghouse")
(18) Rebecca streichelte ihre Katze / *an ihrer Katze [DUR]
'she petted / was petting her cat'
(19) Rebecca sprengte die Brücke / *an der Brücke [PCT; CS]
'she blew up / was blowing up the bridge'
(20) Rebecca schlug ihren Freund / *an ihrem Freund[PCT]
'she hit / was hitting her friend'

Finally, according to Oya (1996), punctuality is among the conditions that determine the occurrence of the expletive reflexive pronoun *sich* with those intransitive verbs that take part in the causative-inchoative alternation in German. Verbs that do not occur with the reflexive pronoun are those that refer to punctual events (*zersplittern* 'to shatter', *zerbrechen* 'to break', *abreißen* 'to tear off'), events that originate naturally (*reifen* 'to ripen', *schmelzen* 'to melt', *gären* 'to ferment'), or to events that constitute movements like *rollen* 'to roll', *segeln* 'to sail', or *fliegen* 'to fly':

(21) der Zweig biegt sich / *der Zweig biegt 'the twig bends'
(22) *der Zweig bricht sich / der Zweig bricht 'the twig breaks'

3 Describing the Data: A Lexical Event Structure Approach

The descriptive value of a lexical-semantic theory of verbs depends on the extent to which it is able to map the distinctions in the syntactic and semantic behavior of verbs onto distinctions in the lexical representations of these verbs. Having this in mind, notice that popular lexical semantic theories like thematic role approaches, decompositional theories or Pustejovsky-style event structure theories do not represent the punctual-durative distinction (see examples below).

With respect to data that cover the breadth of phenomena relevant to lexical semantics, it has been argued in Engelberg (1998) that a lexical event structure theory of a certain type is needed to describe and explain these phenomena. According to this lexical event structure (LES) theory, the meaning of a verb is to be represented as an event structure which has the following characteristics:

i) Complexity of events: Verbs refer to events that are internally structured in the sense that they consist of different subevents (e^1, e^2, ..., e^n) and a possible result state (s).

ii) Sorts of subevents: Subevents are durative (e^{DUR}) or punctual (e^{PCT}).

iii) Relations between subevents: Subevents are causally and temporally related; a subevent can, e.g., precede another subevent (<), or subevents can be temporally parallel (<>).

iv) Participation in subevents: The event participants which correspond to the verb arguments are not necessarily involved in all subevents, but rather only in some of them; participants and subevents are related by semantic relations like ‘control’, ‘move’, ‘volition’, etc., out of which thematic relations can be computed.

v) Implication vs. presupposition: The occurrence of a subevent can be entailed ($==>^I$) or presupposed ($==>^P$) by the verb's meaning.

A verb like *to dry off* as in *Ron dried off the table* is represented in a thematic role approach as in (23) and in a decompositional approach (e.g., Levin and Rappaport Hovav 1996) as in (24), which also contains an additional sorted event argument *e* that is assumed in some decompositional theories (e.g., Wunderlich 1996). In Pustejovsky-style event structure theories the representation is as in (25) in which the event in the event structure ES is represented as consisting of a process and a state. Decompositional propositions are related to each subevent in an LCS' structure out of which a familiar cause-become decomposition (LCS) can be constructed (Pustejovsky 1991).

The representation of *to dry off* in the above described LES theory, as developed in Engelberg (1998), is shown in (26). It says that *to dry off* implies that the event it refers to consists of two subevents e^1 and e^2 and a result state s. The first durative subevent (e.g., Ron's wiping the table), involving a controller (agent) and a theme is temporally parallel to the second durative subevent (the becoming dry of the table) which is followed by a result state (the table being dry)[4]:

(23) *dry off*: x = Agent, y = Theme
(24) *dry off*: (CAUSE (x, BECOME(DRY (y)))) $(e^{\text{TRANSITION}})$
(25) *dry off*: ES: [[Process] [State] $]_{\text{Transition}}$
LCS' [[act(x,y) & • dry(y)] [dry(y)]]
LCS cause(act(x,y), become(dry(y))
(26) *dry off*: $(==>^{I}\ e^{1\text{-DUR}}: x^{\text{Control}}, y^{\text{Theme}})$ <>
$(==>^{I}\ e^{2\text{-DUR}}: y^{\text{Theme}}) < (==>^{I}\ s: y^{\text{Theme}})$

To what extent this theory is able to adequately map distinctions in the behavior of verbs onto lexical representations depends of course on what kinds of syntactic or semantic phenomena are considered to be relevant for lexical semantics at all. According to my understanding the objective of a lexical semantic theory is to support explanations for at least the following four types of phenomena. To illustrate each objective, the data described in section 2 will be revisited, and it will be shown how the relevant meaning distinctions are represented in the LES format.

i) Semantics-syntax mapping: The theory should explain the relations between semantic argument structures and their corresponding syntactic structures ('linking'). Example: The valence alternation between an accusative object and an *an*-construction is restricted to durative verbs followed by a result state as is represented in the partial event structure[5] in (27).

ii) Grammatical-categorial restrictions: The theory should account for the (non-)occurrence of lexical items in certain grammatical categories. Example: The restriction of the progressive to those punctual verbs that either do not involve a result state or that presuppose a preceding event involves verbs with an event structure as in (28) and (29).

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[4] The representation in (26) is an abbreviated form of a meaning postulate in a type-driven predicate logic with a lambda operator, the framework in which the LES theory has been elaborated in Engelberg (1998).

[5] The LES in (27) - (30) is partial in the sense that verb specific information that does not influence the restrictions is omitted, which is indicated by "...".

iii) Co-occurrence restrictions: The theory should express selectional restrictions. Example: PPs of the type *in two hours* are typically combined with verbs with an event structure as in (30).

iv) Interpretation restrictions: The theory should represent systematic restrictions concerning the interpretation of certain classes of lexical items. Example: The iterative interpretation in the progressive aspect involves verbs with the LES in (28).

(27) $\ldots (==>^{I} e^{n\text{-}DUR}: x^{Agent}, y^{Theme}) \ldots < (==>^{I} s: y^{Theme})$
(28) $(==>^{I} e^{n\text{-}PCT}: \ldots)$
(29) $(==>^{P} e^{1\text{-}DUR}: \ldots) < (==>^{I} e^{2\text{-}PCT}: \ldots) < (==>^{I} s: \ldots)$
(30) $\ldots (==>^{I} e^{n\text{-}DUR}: \ldots, y) < (==>^{I} s: y)$

The last two sections have shown that the punctual-durative distinction plays a central role in lexical semantics since it involves all four types of phenomena. Furthermore, I have demonstrated that the lexical origin of the phenomena discussed can in principle be accounted for in the framework presented.

4 Explaining the Data: The Meaning of 'Punctuality'

I have argued elsewhere (Engelberg 1998, 1999) that although most lexical semantic theories are more or less successful in mapping distinctions in the semantic and syntactic behavior of verbs onto distinct structures in lexical representations, these theories do not put much effort into clarifying the semantics of these structures. The meaning representations are often semantically extremely vague, with the result that the syntactic and semantic phenomena to be explained tend to shape the representations in a circular way, thereby yielding empirically weak theories.

To obtain meaning representations that can be examined independently of the phenomena they are supposed to explain three types of clarifications have to be obtained. Firstly, the logical type of the predicates used in the representations has to be determined, e.g., if 'AGENT' is a function or a relation between thing and event individuals, or between predicates and argument positions, etc., and if 'PUNCTUAL' is a first-order property of events or a second-order property of verbal predicates. Secondly, the truth conditions of these predicates have to be worked out more clearly than has been done so far in most lexical semantic theories. Finally, by developing identity criteria for the basic ontological sorts of individual variables it has to be shown what these variables stand for, i.e., it must be clear what, for example, the event variable *e* represents. In the following, I will pursue the first two questions with respect to the predicate 'PUNCTUAL'.

There have been only very few approaches which, like Vendler (1957), relate the class of expressions which are called 'punctual' in this paper to the notion of an 'instant' in temporal logic. Vendler (1957:157) writes about achievements like *win the race*[6]:

> "*A* won on a race between t^1 and t^2, means that *the* time instant at which *A* won that race is between t^1 and t^2."

While this might be justified for the few examples given by Vendler, it seems that most 'punctual' events (as expressed in *to break, to jump, to blast, to knock*, etc.) have a certain duration. This has been noticed by most researchers before and after Vendler, too, beginning with Herling (1840:107), Pott (1859:178), Goodwin (1889:16f), and others. Sarauw (1905:147) observes:

> "Since a shot lasts for a moment, it does take up some time, that is to say, the beginning and the end do not coincide: the shot is not a point in the sense of mathematics, but a point as it stands on a sheet of paper, a point with a certain extension."[7]

What is then the meaning of the predicate 'punctual' if it does not refer to an instant or an instantaneous event in the sense of temporal logic? A claim often made is that an event can simply be linguistically presented as having no duration, or some hint is made at a cognitive device for conceiving of events as punctual even if they are not.

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[6] The only elaborated approach to 'instantaneous' events I'm aware of is Piñon (1997). Introducing boundaries in the basic ontology he can formalize the seemingly contradictory idea, that an event, i.e., an entity that involves a change, can occur at an instant.

[7] My translation of: "Der schuss dauert einen moment, also dauert er, also fallen anfang und ende nicht ganz zusammen: der schuss ist kein punkt im sinne der mathematik, sondern ein punkt wie er auf dem papier steht, mit einer gewissen ausdehnung."

An early example is Curtius (1863), who like many other researchers of that time develops a distinction between punctuality and durativity with the aim of capturing the distinction between perfective and imperfective verb stems in classical Greek. His notion of punctuality involves, like many others, a spatial analogy:

> "The expression 'point of time' is familiar. It is this notion I'm taking up when I say that the action of the aorist can be compared to a point. A point has no extension, and surely no less can be said of the action expressed by the aorist, whose temporal extension is left out of consideration. Actions expressed by speakers as simply occurring [i.e., which are referred to by aorist forms] appear as points to the spectator, just as objects that are far away or receding into the background do, despite their factual extension in space."[8] (Curtius 1863:174)

An early example of an explanation which postulates an ability to conceive of events as punctual can be found in Pott (1859), who treats aspectual pairs and verb pairs related by aktionsart differences on a par and therefore makes punctuality a lexical distinction. He claims that with verb pairs in Slavic and pairs in German like *sitzen* 'to sit' / *sich setzen* 'to sit down' one can discover "[...] that in these pairs reference to the same kind of temporal property is made, which involves - to illustrate the matter briefly and aptly by borrowing a spatial metaphor - whether they are thought of as being punctual in their duration (which, of course, is impossible in the strongest mathematical sense and therefore only relatively true) or being linear" (Pott 1859:178).[9]

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[8] My translation of: "Der Ausdruck Zeitpunkt ist geläufig. An ihn knüpfe ich an, wenn ich sage, dass die Handlung des Aorists einem Punkte verglichen werden könne. Dem Punkte kommt bekanntlich gar keine Ausdehnung zu, ebenso wenig kommt bei der durch den Aorist bezeichneten Handlung ihre zeitliche Erstreckung in Betracht. Und wie entfernte oder in den Hintergrund tretende Gegenstände, trotz ihrer factischen Ausdehnung im Raume, doch als Punkte erscheinen, so auch vom sprechenden *die* Handlungen, die er eben nur als eintretende aufführt."

[9] My translation of: "[...] in beiden Rücksichtnahme auf eine gleiche Eigenschaft der Zeit, nämlich danach, ob sie - um die Sache durch ein vom Raume entlehntes Bild in Kürze und schlagend zu veranschaulichen - ihrer Dauer nach punktuell

A more poetic variant of this kind of semantics we owe to Gildersleeve (1902:251):

> "Tense of duration, tense of momentum, would not be so objectionable, but, unfortunately, duration has to be explained and the seat of the duration put where it belongs, in the eye of the beholder, in the heart of the sympathizer, and not in the action itself. Describe a rapid action and you have the imperfect. Sum up a long action and you have the aorist."

Interestingly, more recent and partly formalized approaches to aspectuality do not differ very much from the older definitions. Platzack (1979:93) claims that punctual verbs refer to events "that do not last in time (or rather, are not conceived of as lasting in time)" and Moens (1987:102) states:

> "[...] processes and culminated processes can be »compressed« into points. This [...] does not mean that they cease to have a temporal duration, but rather that their internal structure is no longer of importance."

While the claim that 'punctual' verbs refer to logical instants is not justified by the reference of most of these verbs, the assumption that we conceive of events as being punctual or that punctuality is a property of verbs does not make much sense either. Concrete events involve a change over time, i.e., duration is an essential property of these events.[10] What it is that we are in fact doing in conceiving of events as having no duration is not conceiving of them as events anymore. It is for this reason that attempts to clarify the meaning of the notion of 'punctuality' have not been very satisfying so far.

At first sight, it seems surprising anyways that languages distinguish between verbs that refer to short events and those that refer to longer events. Most other central concepts in lexical semantics like 'cause', 'agent' or 'will' play a central role in our overall cognitive architecture. I will present evidence that this holds for the durative-punctual distinction, too. A look at

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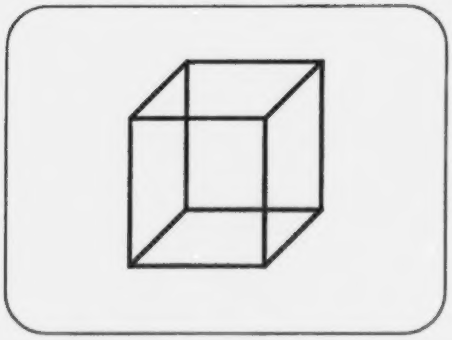
gedacht wird (was freilich in strengster mathematischer Strenge unmöglich und demnach nur beziehungsweise wahr), oder linear."

[10] Cf. Engelberg (1998:216ff) for an extensive discussion on event ontology.

the research on cognitive time concepts reveals that a short interval of 2 to 3 seconds plays a crucial role for perception, behavior, and speech production. The following phenomena involve this three-second interval which I will refer to as the 'cognitive moment'[11]:

i) Errors in the estimation of the length of intervals: Experiments show that the length of short acoustic or visual stimuli is overestimated while the length of long stimuli is underestimated; the threshold between over- and underestimation lies between 2 and 2.5 seconds (Pöppel 1978).
ii) Oscillation of extremely faint sounds: Faint, barely audible acoustic stimuli like the ticking of a watch held some distance from the ear are only perceived periodically; the rhythmic appearance and disappearence of the sound perception occurs every couple of seconds (Urbantschitsch 1875).
iii) Rhythm of metronome beats: Regular metronome beats of equal acoustic quality are perceived as units of two (or more); this "tick-tock" effect disappears if the distance between two beats exceeds about 2.5 seconds (Wundt 1911).
iv) Oscillation of ambivalent patterns: The perception of ambivalent patterns like the Necker cube below oscillates between the two readings of the pattern at least every three seconds or so; to a large degree this occurs independently of the will of the observer (Pöppel 1985).



v) Distance between pauses in speech production: Crosslinguistic investigations of spoken lyrics show a tendency towards rhythms with short pauses about every 3 seconds (Turner and Pöppel 1985). Comparable rhythms can be found in normal speech (Pöppel 1985). It has independently been noticed that rhythmic pauses in speech are not explained by the demands of breathing rhythms (Handel 1989).

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[11] For a more thorough presentation and discussion of the following phenomena, cf. Engelberg (1999).

vi) Rhythm of actions: Intercultural investigations show that simple actions like scratching, hand-shaking, knocking, chopping a tree, waving, or hammering tend to be bundled into rhythmic groups with a length of two to three seconds, interrupted by short breaks (Feldhütter, Schleidt and Eibl-Eibesfeldt 1990).

The cognitive moment or "subjective present" as this interval has been called is determined by a neural mechanism that integrates successive events into a perceptual gestalt whose duration is restricted to an upper limit of about three seconds (Pöppel 1985:53). This gestalt creates something like a "window of consciousness" that induces a "feeling of nowness". Since the perception of events and the structure of our own actions is determined by the cognitve moment, it can be assumed that our general cognitive concept of events involves a classification of events that is mirrored in the way we use verbs to talk about events: punctual events are events that don't take longer than the time of the cognitive moment while durative events exceed this three-second interval.

Since the proposed conception of punctuality is based largely on our perceptual system, it relates to relatively simple, concrete events. The basic readings of verbs can be defined as those readings in which reference is made to events that are immediately available perceptually, as for example in (31). But metaphorical readings often involve reference to more abstract events in which the temporal structure of the basic reading is not completely preserved as in (32) which we can hardly call 'punctual' in the sense that it refers to an interval shorter than three seconds. Nevertheless, in both readings the accusative object cannot be replaced by the *an*-construction showing that the basic reading of the verb determines its behavior.[12]

(31) sie spaltete das Brett / *an dem Brett
'she split the board / was splitting the board'
(32) sie spaltete die Partei / *an der Partei
'she divided ("split") the party / was dividing the party'

Thus, finally, if we want to conceive of 'punctuality' as a second-order property we can call those verbs punctual that refer to punctual events in their basic reading.

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[12] Cf. for a more detailed discussion Engelberg (1999).

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Acquisition of Default Inflectional Suffixes: Japanese Adjectives[*]

Miho Fujiwara

1 Introduction

This study reports on how children come to learn two inflectional classes of adjectives in Japanese. Are the two inflectional classes learned simultaneously or is one learned before the other? Do children use the same class of inflectional suffix as the default as adults? On what basis do children distinguish the two classes of inflections?

The study was designed to test which class of inflectional suffix would be used by children and adults on both existing and novel words. They were asked to provide the past form of the adjectives, which they heard in their nonpast forms. The results show the past-tense form for one inflectional class is acquired earlier than the other, and overgeneralized for both existing and novel adjectives (4-year-olds). Interestingly, this is not the default form adults extend productively to novel adjectives. However, once the other inflectional class is acquired, children, like adults, use this form as the default, and overgeneralize this form (5-year-olds). The results also show that children do not use the morphological information (i.e., suffix) in the stimuli as effectively as adults in determining class membership of novel adjectives.

This paper is organized as follows. Section 2 introduces the two inflectional classes for Japanese Adjective. I present research questions about the Japanese Adjective inflectional classes from the child language acquisition of view. Section 3 illustrates an experiment conducted to answer the research questions. Section 4 reports the results. Section 5 presents a possible acquisition sequence to account for the results and raises further questions for future research.

2 Japanese Adjectives

Japanese has two types of adjectives in one language system (Kuno 1973, Martin 1975 and many others). One is called Verbal Adjective (VA) and the other Nominal Adjective (NA). The morphological differences between these two types of adjectives are observed in their predicative use in (1), attributive use in (2) and negative clauses in (3). In predicative use, VAs inflect for tense with a nonpast tense *–i* suffix and a past tense *–katta* suffix, as shown in (1a). The paradigm of NAs, on the hand, follows that of the copula: nonpast tense *–da* and past tense *–datta*, as shown in (1b).

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(1) a. Ano hito-ga utukusi-***i/-katta*** (VA)
that person-NOM beautiful-NONPAST/PAST[1]
'That person is/was beautiful.'
b. Ano hito-ga kiree-**da/-datta** (NA)
that person-NOM beautiful -NONPAST/PAST
'That person is/was beautiful.'

In adnominal position, VAs require a suffix *-i* (2a), while NAs require a suffix *–na* (2b).

(2) a. utukusi-***i*** hito (VA)
beautiful-ATT person
'beautiful person'
b. *kiree*-***na*** hito (NA)
beautiful-ATT person
'beautiful person'

In negative clauses, when the adjectives are followed by a negative suffix *na-i/-katta* NEG-NONPAST/PAST, VAs need a suffix *–ku* (3a) and NAs need a suffix *–de* (3b) between the stem and the negative.[2]

(3) a. Ano hito-ga utukusi-***ku***-*na-i/-katta* (VA)
that person-NOM beautiful-ku-NEG-NONPAST/PAST
'That person is/was not beautiful.'
b. Ano hito-ga kiree-***de***-*na-i/-katta* (NA)
that person-NOM beautiful-de-NEG-NONPAST/PAST
'That person is/was not beautiful.'

As shown above, VAs and NAs are morphologically different. However, these two types of adjectives both denote properties and are not semantically distinguishable. For example, as shown in the examples above, the primary or central concept of "BEAUTIFUL" can be either expressed by a VA *utukusi-* or an NA *kiree-* (Urushibara 1993: 40-41). Thus, I assume that VAs and NAs are not categorically different (i.e., both are Adjective), and that each of them constitutes an inflectional class for Adjective. The two inflectional classes, VA class and NA class, are summarized in Table 1.

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[1] The abbreviations in the examples are as follows: NOM (nominative), ATT (attributive), and NEG (negative).

[2] How to analyze these two suffixes, *-ku* and *–de*, is an interesting controversial issue, but I do not analyze them here since it is beyond the scope of this study. All I assume here is that these two are used in a parallel manner. See Martin (1975), Urushibara (1993) and Nishiyama (1998) for their analyses of these two suffixes.

	VA class *utukusi-* 'beautiful'	NA class *kiree-* 'beautiful'
Predicative		
Nonpast	*-i*	*-da*
Past	*-katta*	*-datta*
Negative	*-ku-na-i/-katta*	*-de-na-i/-katta*
Attributive	*-i*	*-na*

Table 1: Suffixes for Japanese adjective inflections

We need to know, for a given adjective, which class it belongs to in order to use the appropriate inflectional suffix. How do we assure that a given adjective will choose an appropriate suffix for a given morphosyntactic property array? Nishiyama (1998) observes that all VAs are native words and monomorphemic, while NAs are loan-words or bimorphemic. However, this vocabulary stratum (whether it is native or loan) is not an appropriate predictor of inflection class because even native speakers of Japanese do not necessarily know the origin of a given word. They, especially children, do not have access to the etymology of the word. So on what basis is the suffix for a given adjective chosen over another?

What Nishiyama's observation tells, however, is that the VA class is a fixed list of only native adjectives, while NA is an open list, in which bimorphemic native words and any loan words can enter newly. In other words, NA class inflections are used as the default in the adult language system. This means that if a given adjective is classified as a VA, use the VA class inflectional suffixes. Otherwise, use NA suffixes.

We have seen so far that Japanese Adjectives have two inflectional classes, VA class and NA class, and that the NA class inflections seem to be used more productively than the VA class inflections. The two inflectional classes of Japanese adjectives raise an interesting question: How are these two classes acquired? More specifically, we can set up the following research questions.

(4) Research Questions

a. At what point do Japanese speaking children correctly differentiate VAs from NAs?

b. On what basis do they categorize a given adjective as VA or NA?

In particular, in this study, we will ask:

c. Do the children acquire both classes' inflections simultaneously? If not, which one is first?

d. Do they overgeneralize one class of inflections to the other systematically? If so, which direction?

e. Which class of inflectional suffixes do they use when they encounter novel adjectives?

In order to answer these research questions, I conducted the following pilot study, focusing on the past and the nonpast tense inflectional suffixes.

3 Method

Ten children (five 5-year-olds [age 5;0-5;3] and five 4-year-olds [age 4;0-4;7]) and 24 adults participated in this study. They were all monolingual native speakers of Japanese. All the children's data were collected in Japan, while that for adults was in the Unites States.

Thirty-two existing adjectival stems (16 VAs and 16 NAs) and thirty-two novels adjectival stems (16 VAs and 16 NAs) were used as spoken stimuli.[3] The stimuli using existing adjectival stems consisted of two patterns: the grammatical combination of the stem and the nonpast tense suffix (8 VA-*i* [e.g., *haya-i* 'fast-nonpast'] and 8 NA-*da* [e.g., *hen-da* 'strange-nonpast']) and an ungrammatical combination of the stem and the suffix (8 *VA-*da* [e.g., *haya-da*] and 8 *NA-*i* [e.g., *hen-i*]). The stimuli with novel adjectival stems also had two patterns: the stems with matching suffixes (8 VA-*i* [e.g., *kutosi-i*] and 8 NA-*da* [e.g., *buran-da*]) or with mismatched suffixes (8 VA-*da* [e.g., *kutosi-da*] and 8 NA-*i* [e.g., *buran-i*]).

The subjects were asked to instruct a puppet in providing the past tense form of the adjectives, which they heard in their nonpast form. The puppet was introduced to the subjects as a beginning learner of Japanese, who did not know past tense forms and used only nonpast forms when past forms were appropriate. They were also told that the puppet might make a mistake in what it said or make up new words. With these in mind, the subjects were asked to say the past tense forms of the adjectives the puppet had produced in nonpast forms.

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[3] Many of the novel adjectival stems were taken from Hagiwara *et al* (1997), which were made to sound like either VA or NA adjectives. Some were created following their criteria of VA and NA sounds.

The subjects' responses were categorized based on the types of the past tense suffixes they produced (VA suffix *–katta*, or NA suffix *–datta*).

4 Results

The results show that the adults' default past suffix is *–datta* (NA), while that of the 4-year-olds is *–katta* (VA). In fact, the data suggest that 4-year-olds do not yet realize that the NA class, in contrast to the VA class, exists and thus analyze *–katta* as the past suffix for adjectives in general. On the other hand, the 5-year-olds' data indicate they have acquired both VA and NA inflections. Moreover, the NA *–datta* suffix is overgeneralized to the extent that it replaces the VA inflection *–katta*.

The results also show that children (both 4 and 5 years) did not use the morphological information (i.e., suffix) in the stimuli as effectively as adults in determining which past tense suffix should be used for the novel stem stimuli.

4.1 Existing Stems

The Figure 1 shows the percentages of the past tense forms (VA suffix *–katta* and NA suffix *–datta*) produced by adults in response to each stimulus. Stimuli shown at each end of the graph (VA-*i* and NA-*da*) are grammatical and the ones in the middle (*VA-*da* and *NA-*i*) are ungrammatical. Adults used appropriate past forms for grammatical stimuli almost perfectly. When the nonpast suffix was not matched with the stem type in stimulus, the *-datta* suffix was used more often than *–katta* (Compare the percentages of *–datta* responses for *VA-*da* with that of *–katta* for *NA-*i*). This result suggests that adults used NA suffix *–datta* as the default.

On the other hand, the results of the 4-year-olds in Figure 2 demonstrate that the children predominantly used the VA suffix *–katta*, for both ungrammatical stimuli (*VA-*da* and *NA-*i*). They also used *–katta* as often as the NA suffix *–datta* even for the grammatical NA-*da* stimulus, where the *–datta* suffix was the appropriate suffix. These results illustrate a case in which the VA suffix *–katta* was used as the default.

The results of the 5-year-old children in Figure 3 show that they appropriately used past forms for the appropriate combination of the stem and the nonpast suffix (VA-*i* and NA-*da*). At least, this suggests that the 5-year-old children use both *–katta* and *–datta* suffixes. They also use both past tense suffixes (*-katta* and *–datta*) for each inappropriately combined stimulus (*VA-*da* and *NA-*i*), but this is due to the fact that some subjects only used

–katta and some only used *–datta.* Two subjects used mostly *–katta* as the default for the ungrammatical stimuli, while the other three predominantly used *–datta* as the default. Thus, Figure 3 does not reflect any of the 5-year-old individual subjects' response pattern.

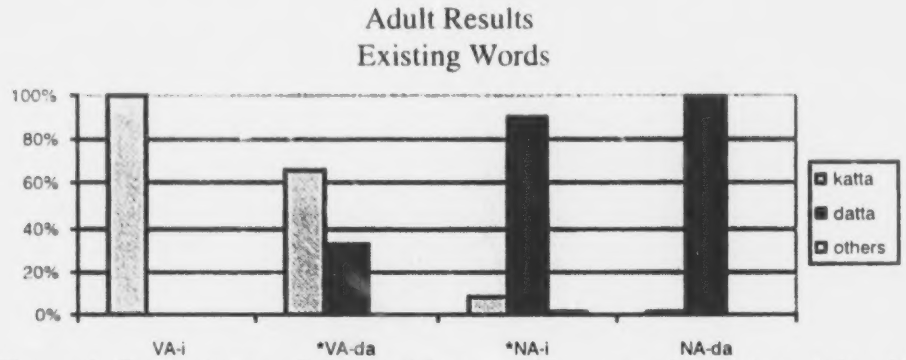


Figure 1: Percentages of the past tense suffixes, produced by adults, for the stimuli with existing stems and nonpast suffixes.

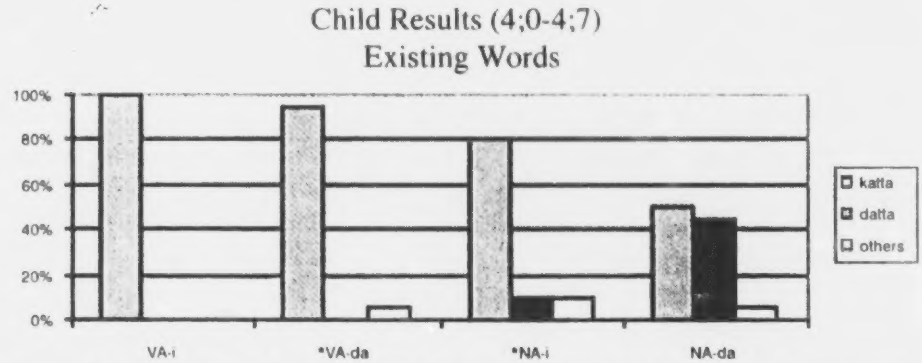


Figure 2: Percentages of the past tense suffixes, produced by 4-year-old children, for the stimuli with existing stems and nonpast suffixes.

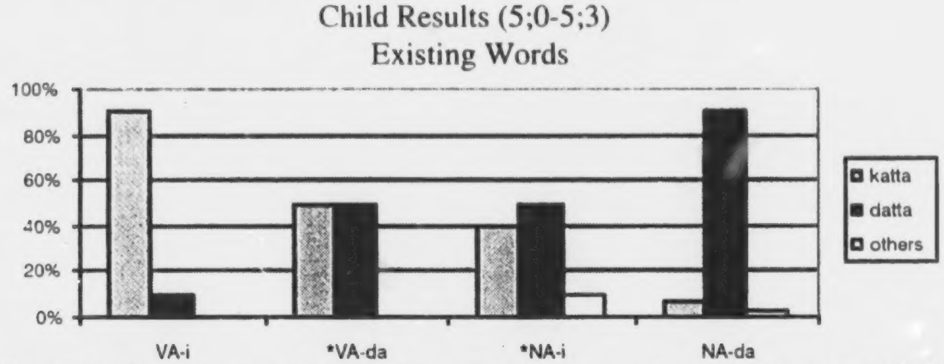


Figure 3: Percentages of the past tense suffixes, produced by 5-year-old children, for the stimuli with existing stems and nonpast suffixes.

4.2 Novel Stems

Figure 4 shows the adult results for the novel stem stimuli. The results show that the choice of the past tense suffix tended to rely on the nonpast suffix in the stimuli. That is, for the stimuli with the VA nonpast suffix -*i* (VA-*i* and NA-*i*), the VA past suffix –*katta* was used more often than the NA past suffix –*datta*. On the other hand, for the stimuli with the NA nonpast suffix –*da* (VA-*da* and NA-*da*), the NA past suffix –*datta* was used more often than the VA suffix –*katta*.

Figure 4 also indicates that the suffix –*datta* was also used as the default. The responses to the inappropriately combined stem and the suffix (VA-da and NA-*i*) included the suffixes which were not chosen based on the type of the suffix in the stimuli. When you compare the percentage of the –*katta* suffix chosen for the VA-*da* stimulus and that of the –*datta* suffix for NA-*i*, the latter is larger than the former. It implies that there is a tendency to use –*datta* as the default.

The results of the 4-year-olds in Figure 5 clearly demonstrate that there is a strong tendency to use the VA suffix –*katta* almost regardless of the stimuli. This suggests that the suffix –*katta* was the only productive suffix.

Figure 6 shows that the use of –*datta* by the 5-year-olds was more productive than by adults or the 4-year-olds. The 5-year-olds' result is in fact a mixture of the subjects using –*datta* overwhelmingly and those who used in more adult-like pattern. Three children used –*datta* very productively and we observe overgeneralization of –*datta*.

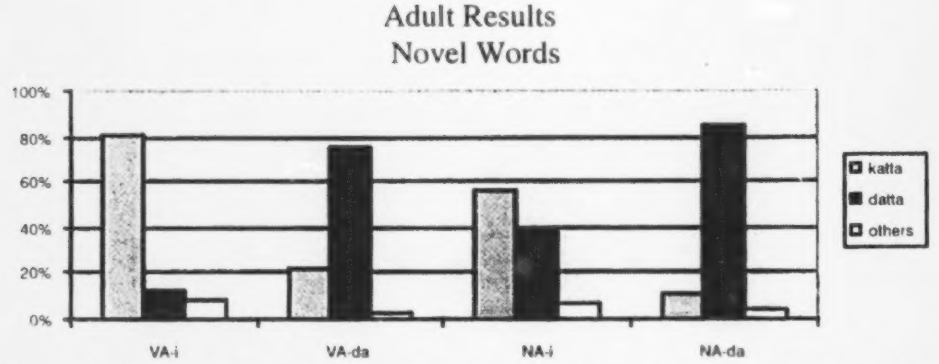

Adult Results
Novel Words

Figure 4: Percentages of the past tense suffixes, produced by adults, for the stimuli with novel stems and nonpast suffixes.

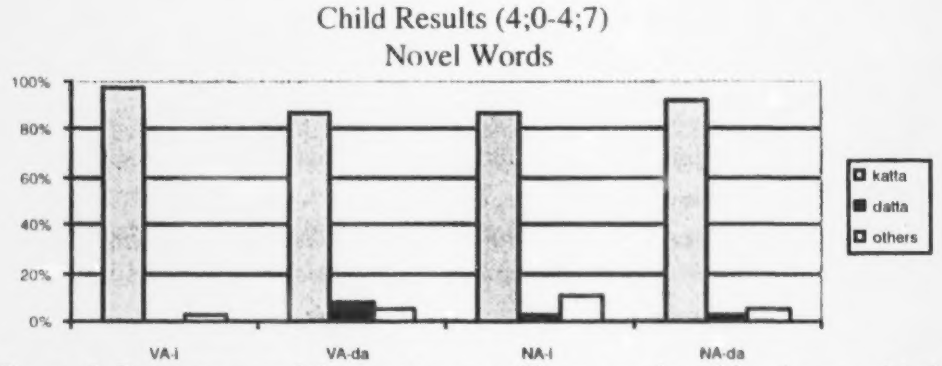
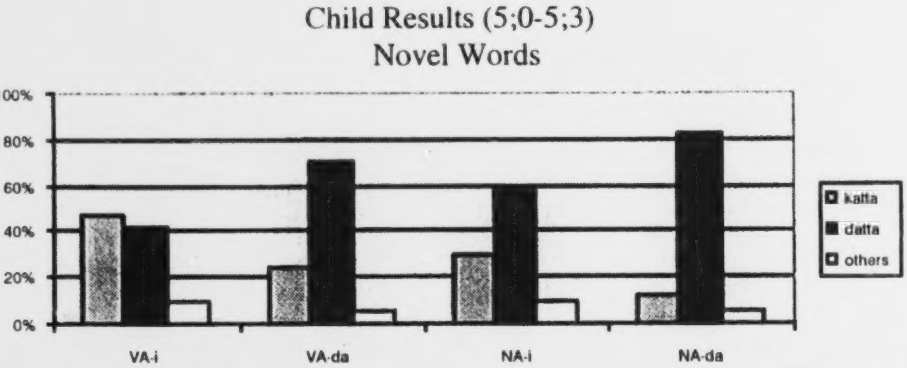

Child Results (4;0-4;7)
Novel Words

Figure 5: Percentages of the past tense suffixes, produced by 4-year-old children, for the stimuli with novel stems and nonpast suffixes.

The following tables further provide data which indicate that the suffix –*datta* is more productively used by the adults and the 5-year-olds than the 4-year-olds. Tables 2, 3 and 4 show the details of the novel stems forms to which the past tense suffixes were attached. The focus is on the case where the subjects failed to identify the novel stems correctly, in other words, the case where they failed to separate the nonpast suffixes from the stems. Those responses are stem-**i**-*katta* / stem-**da**-*katta* and stem-**da**-*datta* / stem-**i**-*datta* and they are highlighted in the boxes in the tables. These indicate which past tense suffix the subjects chose when they could not base their choice on the nonpast suffix in the stimuli.

Table 2 shows that adults more often used –*datta* than –*katta* when they failed to identify the correct stems. The 4-year-olds in Table 3, on the other hand, demonstrate that they used only –*katta*. In addition, the table shows



Child Results (5;0-5;3)
Novel Words

Figure 6: Percentages of the past tense suffixes, produced by 5-year-old children, for the stimuli with novel stems and nonpast suffixes.

that the 4-year-olds separated the suffix in the stimuli better with the VA nonpast suffix *–i* than with the NA *-da*. In Table 4, the 5-year-olds used mostly *–datta* in the environment where a default suffix is expected. It is also illustrated that the 5-year-olds were not good at separating the suffixes from the stems in the stimuli.

These three tables suggest that *–datta* is the default for adults and the 5-year-olds but not for the 4-year-olds. Moreover, Table 4 illustrates that many of the overgeneralization cases of the suffix *–datta* by the 5-year-olds was actually caused by their inability to identify the nonpast suffix in the stimuli. Since they could not base the choice of the past tense suffix on the suffix in stimuli, they chose the suffix *–datta* as the default.

stimuli	TYPE OF RESPONCES							
	katta			**datta**			**others**	
	stem-	**stem -i/da-**	Truncated Stem-	stem-	**stem -i/da-**	truncated stem-	others	(sum)
VA-i	73%	**3%**	4%	2%	**8%**	2%	8%	100%
VA-da	15%	**1%**	6%	65%	**8%**	2%	3%	100%
NA-i	43%	**6%**	7%	13%	**25%**	1%	6%	100%
NA-da	8%	**1%**	2%	77%	**7%**	1%	4%	100%

Table 2: Percentages of the past tense suffix and stem forms the adults chose for each stimulus.

	TYPE OF RESPONCES							
stimuli	**katta**			**datta**			**others**	
	stem-	**stem -i/da-**	Truncated Stem-	stem-	**stem -i/da-**	truncated stem-	others	(sum)
VA-i	53%	**38%**	8%	0%	**0%**	0%	3%	100%
VA-da	20%	**63%**	5%	5%	**0%**	3%	5%	100%
NA-i	45%	**35%**	8%	0%	**0%**	3%	10%	100%
NA-da	18%	**64%**	10%	3%	**0%**	0%	5%	100%

Table 3: Percentages of the past tense suffix and stem forms the 4-year-olds chose for each stimulus.

	TYPE OF RESPONCES							
stimuli	**katta**			**datta**			**others**	
	stem-	**stem -i/da-**	Truncated Stem-	stem-	**stem -i/da-**	truncated stem-	others	(sum)
VA-i	45%	**3%**	0%	3%	**40%**	0%	10%	100%
VA-da	23%	**3%**	0%	35%	**35%**	0%	5%	100%
NA-i	25%	**3%**	3%	18%	**43%**	0%	10%	100%
NA-da	8%	**5%**	0%	44%	**38%**	0%	5%	100%

Table 4: Percentages of the past tense suffix and stem forms the 5-year-olds chose for each stimulus.

4.3 Major Findings

In summary, we have found that the productive suffix is different between the 4-year-olds and the 5-year-olds/adults. The first finding is that the adults' default past tense suffix for adjectives is *–datta* (the NA suffix). Second, on the other hand, the 4-year-olds' default form is *–katta* (the VA suffix). The data suggest that the 4-year-olds have not yet distinguished the NAs from the VAs perfectly, and that their productive suffix is *–katta* (VA). Third, the suffix *–katta* is no longer the default among the 5-year-olds; rather, the 5-year-olds' data suggest that the *–datta* suffix is default. This *–datta* suffix is overgeneralized to the contexts where the VA suffix *–katta* should be used. In other words, the suffix *–katta*, which was productively used by the 4-year-olds, does not block the use of the suffix *–datta* even when the *–katta* suffix is appropriate.

We have also found that the degree of the use of morphological information is different between adults and children. The fourth finding is that there is less use of morphological information in the stimuli for both 4 and 5-year-olds. Adults use morphological information (i.e., the nonpast suffix) to determine the class-type of novel adjectives to a certain extent, while children (both 4 and 5 years old) do not use this information as effectively as adults. This resulted in the cases where they failed to identify the nonpast suffixes and failed to separate them from the stems (Table 3 and Table 4). Fifth, the NA suffixes (*-da/-datta*) are not fully acquired by the 4-year-olds. They recognized the NA suffix *–da* less well than the VA suffix *–i* as a suffix in the stimuli. Moreover, they hardly produced the NA suffix *–datta* in production (except for the response to the existing NA-*da* stimulus, which is a grammatical one. In the next section, we will see a possible scenario of acquiring both types of Japanese adjectives that might explain the findings we have just seen.

5 Discussion

The present data suggests the following acquisition sequence, as schematized in Figure 7.

No class distinction between VAs and NAs (4-year-olds)
→ Children analyze that *–katta* is the past tense suffix for adjectives in general.

↓

Productive use of the NA suffix *–datta*: replacing *–katta* with *–datta*. (5-year-olds)
→ Overgeneralization

↓

Reanalyzing and relearning of VA as a separate class from NAs
→Two inflectional classes of adjectives (VA class and NA class as the default)

Figure 7: A proposed acquisition sequence for Japanese adjectives

The 4-year-olds use the VA past tense suffix *–katta* predominantly. They produce the NA past suffix *–datta* only when the stimuli are the appropriate NA nonpast forms, i.e., a NA stem + *da* (see Figure 2). However, even for this grammatical stimulus, they produced *–datta* in only half of the responses. This indicates that the VA class suffix (*-katta*) is better acquired than the NA class suffix (*-datta*) at this age.

I posit that the 4-year-old children have not yet realized that Japanese adjectives can be categorized into two classes, each of which has its own inflectional paradigm. They have only one adjectival inflectional paradigm (i.e., VA class: *-i, -katta,* etc.), and they have not yet realized the other paradigm (i.e., *-da*, *-datta* etc.) for other type of adjectives (NAs). Some use of –*datta* can be explained in that children learn these lexical items individually, but they have not yet realized that these suffixes (*-da –datta* etc.) indicate another inflectional class for adjectives. Thus, for the 4-year-olds, the VA suffix *–katta* is the ONLY productive past tense suffix they have for adjectives in general. This explains why we only see the VA suffix *–katta* as a productive suffix in the 4-year-olds' results, especially for the responses to novel adjectives (See Figure 2 and Figure 5).

The reason why NA class suffix (*-datta*) is less well acquired by the 4-year-old children can be related to the fact that this NA inflectional class paradigm is a less marked paradigm in Japanese. Almost the identical paradigm is used for noun (N) and post positional phrase (PP).[4] On the other hand, the VA class inflectional paradigm is unique to VAs and, in that sense, it is more marked within the language. In other words, the VA class inflections are more easily identified with adjectives than the NA class inflections. Thus, the 4-year-old children first analyze that VA suffixes are used for all adjectives in general. The second possible reason for less well acquired NA suffixes could be the optional use of the NA nonpast tense suffix *–da*. In spoken language, the suffix *–da* is often omitted, while the VA counter part suffix *–i* is obligatory. This might make it easy for children to form the VA *-i* vs. *–katta* contrast than the NA *–da* vs. *–datta*.

Then, later, the 5-year-olds come to realize that *–datta* is also an adjectival suffix. They have learned the existence of the NA class. Some replaced *–katta* with *–datta*, even when *–katta* was the appropriate suffix. This means that the suffix *–katta* could not block the use of *–datta*. This supports the idea that the inflectional suffix *–katta* was not learned as the suffix of VAs, but that it was rather learned as the suffix for adjectives in general. Because of its weak identification with VAs, the *–katta* suffix could not stop the suffix *–datta*, and the overgeneralization of *–datta* takes place here.

Eventually, children come to realize the two distinct classes of adjectives and relearn the *–katta* suffix as a VA class suffix, as opposed to the general suffix for adjectives. As a result, children learn that there are two inflectional classes of adjectives in Japanese: one has VA inflectional paradigm and the other has NA paradigm as the default, which is supposed to be what the adults have.

---

[4] The only difference is the attributive form.: NA-*na*, N-*no* and PP-*no*.

This study made it clear that Japanese children started with one of the adjectival inflectional suffixes (*-katta*), which was not the default form in the adult language. Eventually, they came to learn the other inflectional suffix (*-datta)* and started to use it as the default, like the adults. What remained unanswered is how the children come to distinguish the two types of adjectives. Once the category distinction has been acquired, on what basis do children classify the adjectives they encounter every day? Are they stored in memory or triggered by some class features? We will leave these questions to future research.

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Possessor Extraction in Child English: A Minimalist Account

Elena Gavruseva and Rosalind Thornton

This paper reports the results of an experimental study that investigated how young English-speaking children acquire questions with *wh*-possessive phrases such as 'whose hat'. It has been noted since Ross (1967) that adult English patterns with other Germanic languages in enforcing obligatory pied-piping of *whose*-phrases, as shown in (1):

(1) a. Whose hat did he take?
b. **Whose* did he take *hat*?
c. **Who* did he take *'s hat*?

The examples in (1) show that neither extraction of the genitive wh-possessor 'whose', nor extraction of the bare wh-possessor 'who' is allowed.[1] By contrast, in languages like Hungarian, Tzotzil, and Russian, wh-possessors are free to optionally extract out of NP. Consider a representative example from Hungarian that illustrates optional extraction of the wh-possessor NP in dative case (the data are from Szabolcsi 1994):

(2) *Ki-nek*$_k$ ismer-té-tek [$_{DP}$ t_k a vendég-é-ø-t]]]?
Who-Dat know-past.2pl the guest -poss.3sg.Acc
'Whose guest did you know?'

The work of Chung (1991) on Chamorro appears to suggest that there is a third alternative to pied-piping, namely, obligatory extraction of wh-possessors, as illustrated in (3):

(3) *Hayi*$_k$ un-yuland [$_{DP}$ munika-ña t_k]?
Who Infl(2c)-break doll-Agr(3sg)
'Whose doll did you break?'

---

[1] Ross (1967) labeled the ungrammatical examples in 1(b,c) as 'left-branch violations'. In this paper, we will use the term 'possessor extraction' to avoid a language-specific bias in terminology, since crosslinguistically wh-possessors may occupy a left or a right branch of the Spec of NP.

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We take the crosslinguistic facts in (1-3) to suggest that there exist three types of grammar with respect to possessor extraction possibilities:

(a) Grammar Type A (Germanic languages): obligatory pied-piping
(b) Grammar Type B (e.g. Hungarian): optional possessor extraction
(c) Grammar Type C (e.g. Chamorro): obligatory extraction

Given the parametric variation in extractability of wh-possessors, the purpose of the experiment was to investigate how English-speaking children converge on Grammar Type A. The Subset Principle (Berwick 1985) predicts that children should start out with the most restrictive option that can be disconfirmed using positive evidence from the types of sentences found in the child's linguistic environment. Strictly speaking, both Grammar Type A (obligatory pied-piping) and Grammar Type C (obligatory extraction) can be viewed as subsets of Grammar Type B, where possessor extraction is optional. Thus we can expect children to start out with an adult-like option or with a Chamorro-like option, which they later should discard in favor of obligatory pied-piping. Our experiment investigated precisely these predictions.

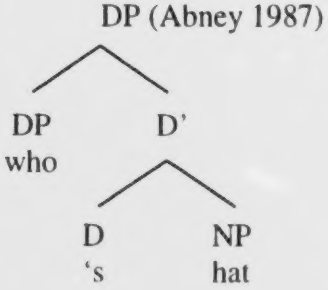
1 Theoretical Background

In this section, we present a more detailed theoretical background of the study. We begin by reviewing some recent studies of possessive constructions in English and some recent syntactic proposals that attempted to pinpoint the source of parametric variation in possessor extraction. At the end of the section, we offer our own perspective on the aforementioned parametric differences.

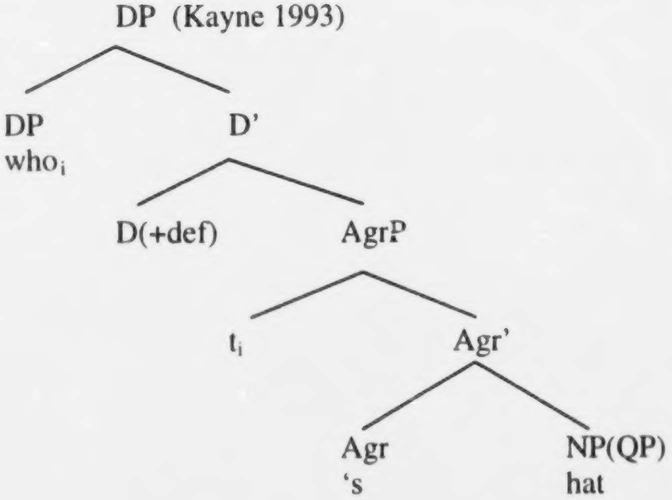
1.1 Possessive Noun Phrases in English

Wh-possessives have a complex internal structure in English. In (4-5), we present two widely-known analyses of possessive nominals, that of Abney (1987) and that of Kayne (1993):

(4)



(5)



On Abney's (1987) analysis, the possessive clitic *'s* projects a D head in the nominal structure; the wh-possessor sits in its specifier and the possessed noun functions as its complement. Kayne (1993) follows Szabolcsi (1983/84) who proposed that the structure of noun phrases essentially parallels the structure of clauses in that it contains two functional projections: AgrP and DP (AgrP being parallel to IP and DP being parallel to CP). In Kayne's structure, possessor phrases undergo movement from Spec,AgrP to Spec, DP where they receive Case from a [+definite] null D. The structures in (4-5) shed some light on the non-extractability of 'whose'. In particular, Kayne (1993) suggests that 'whose' cannot extract because 'who' and *'s* do not form a constituent. Therefore, extraction of 'whose' violates a principle of grammar requiring that only constituents be subject to movement operations.

The explanations for the non-extractability of the bare wh-possessor 'who' centered around the phonological constraints on the cliticization of the possessive clitic *'s*. Radford (1997), among others, suggests that the cliticization of *'s* obeys the adjacency requirement, meaning that *'s* can only cliticize onto the constituents in the Spec of DP. Chomsky (1995) proposes that a string consisting of the clitic *'s* and the possessed NP (*'s hat*) is not a legitimate object at PF. The question that we will address in the remainder of the section is whether there is a deeper property of possessive DPs in English that disallows possessor extraction. By a 'deeper property', we mean the one that is unrelated to the syntactic status of the clitic *'s* or its phonological properties. In considering this question, we take a brief look at the analyses of possessor extraction in languages such as Hungarian, Tzotzil, and Chamorro.

1.2 Possessor Extraction in Hungarian, Tzotzil, and Chamorro

Let us begin by considering the surface form of wh-possessives in Hungarian, Tzotzil, and Chamorro. The data in (6) below are strikingly similar: wh-possessors agree with the possessed nouns in person and number features in all three languages:

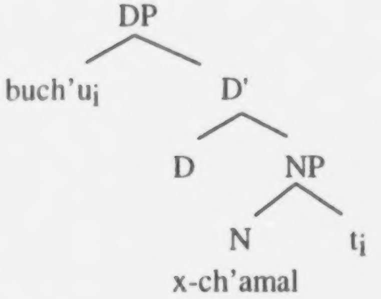
(6) a. Ki-nek a vendég-é-ø-t (Hungarian, Szabolcsi 1983/84)
who-Dat the guest-poss.3sg.Acc
'Whose hat?'
b. Buch'u s-tot (Tztozil, Aissen 1996)
who 3sg-father
'Whose father?'
c. Hayi munika-ña (Chamorro, Chung 1991)
who doll-Agr(3sg)
'Whose doll?'

The possessor-possessed NP agreement is morphologically visible in the form of an affix on the possessed NP. In all three languages, the same affix is used to mark subject-verb agreement, which makes possessor agreement parallel to the clausal agreement. Tzotzil and Chamorro differ from Hungarian in two respects, however: (a) there is no overt definite determiner in-between the possessor and the possessed noun; (b) the wh-possessors are not overtly marked for case.

Now let us examine the internal structure of possessive phrases and the steps of possessor extraction in these languages. We will claim that Hungarian, Chamorro, and Tzotzil are similar in that wh-possessors extract out of the DP in two steps. First, possessor phrases move to a specifier position of Agr where they trigger agreement in person and number with the possessed noun. Next, they move to a peripheral A-bar position of D which appears to serve as an escape hatch for extraction.

Consider first the steps of possessor extraction in Tzotzil as suggested in Aissen (1996):

(7)



In proposing the structure in (7), Aissen (1996) points out that wh-possessors are required to extract via the Spec of DP, presumably for scope-taking reasons. The evidence for Aissen's argument comes from the complementary distribution between lexical and wh-possessors. In Tzotzil, lexical possessor phrases follow the possessed noun and the definite determiner. If a lexical possessor DP is preposed, the construction becomes ungrammatical. Consider the data in (8):

(8) a. s-p'in li Maruch-e
A3-pot the Maruch-ENC
'Maruch's pot'
b. *[*li Maruch*] s-p'in [*t*].....-e
the Maruch A3-pot....ENC
'Maruch's pot'

By contrast, wh-possessors do not co-occur with the definite determiner and have to precede the possessed noun, as illustrated in (9):

(9) a. [*buch'u*] x-ch'amal [*t*]
who A3-child
'Whose child?'
b. *x-ch'amal [buch'u]
A3-child who
'Whose child?'

Aissen takes the facts in (8-9) to suggest that the Spec of DP is an operator position, that is, it can only be occupied by wh-elements. Notice also that Aissen assumes that possessor-phrases are base-generated in the specifier of the possessed noun. However, following Szabolcsi (1983/84, 1994), we propose that possessor noun phrases trigger person/number agreement with the possessed noun in a higher functional projection AgrP, much in the same way as clausal DP subjects. In (10), we present Szabolcsi's (1983/84) analysis of possessor extraction in Hungarian:

(10) *Ki-nek*$_k$...[$_{DP}$ t_k'' [$_D$ a [$_{AgrP}$ t_k' [$_{Agr}$ (+poss) [$_{NP}$ t_k kalap-ja]]]]]
who-Dat the hat-poss.3sg.Acc

In (10), the possessor originates in the specifier of the possessed noun, then moves to Spec,AgrP and from there moves to Spec,DP. Possessor extraction to Spec,CP takes place from Spec,DP. Szabolcsi (1994) claims that possessor movement to Spec,DP is facilitated by the need to turn a functional head D into a proper governor for the trace in Spec,AgrP.

Given that Chamorro possessives also manifest possessor-agreement in the DP, it is plausible to suppose that wh-possessors extract out of the DP in a two-step fashion. As for why wh-possessors seem to obligatorily extract out of DP in Chamorro, we suggest that this property may be related to the null nature of D. It is worth noting that both lexical and wh-possessors obligatorily extract in Hungarian when the determiner projecting a higher DP is null, as in the so-called 'existential possessive constructions' (for details, see Szabolcsi (1994:223-225)).

1.3 Parametric Accounts of Possessor Extraction

In this section, we present and evaluate some recent proposals that attempted to account for the crosslinguistic variation in possessor extraction. In some earlier syntactic work, extraction possibilities out of NP were accounted for in terms of general constraints on wh-movement such as the ECP, or single syntactic conditions such (e.g. Left-Branch Condition, Ross 1967). Corver (1990) addresses the differences in extraction patterns out of NP between the Germanic and Slavic languages. He suggests that the differences follow from the interaction of the ECP, the syntactic status of noun phrases (DPs in Germanic vs. NPs in Slavic), and the case assignment mechanism.[2] Cover stipulates that structural case can block antecedent-government if it is assigned to a DP as opposed to a NP argument.

On the other hand, Uriagereka (1988) proposes that the locus of the parametric differences in extraction out of the DP resides in the morphological status of the D head. The gist of his proposal is that the morphological status of D (null vs. overt) may determine the 'richness' of D in a language: the 'richer' the D is, the more of a barrier it evokes. Presumably, D is

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[2] Corver (1990) adopts Chomsky's (1986) definition of ECP as antecedent-government.

'richer' in languages where it is morphologically expressed. Notice that neither Corver's, nor Uriagereka's proposals explain the data from Hungarian, Tzotzil, and Chamorro. Just like in Germanic, the possessive noun phrases in these languages project to DP and are assigned structural case. However, contrary to Corver, the DPs are not barriers for extraction. Uriagereka's reasoning predicts that the determiner *a(z)* ('the') in Hungarian possessives should count as 'rich' and evoke a barrier, since it is morphologically overt. We showed in section (1.2) that this is not the case.

In this paper, we will adopt a parametric account of possessor extraction suggested in Gavruseva (1999, in progress) that incorporates the facts from Hungarian, Chamorro, and Tzotzil into the picture. Gavruseva observes that Szabolcsi's (1994) analysis essentially purports that possessors in Hungarian extract successive-cyclically out of DP. Szabolcsi motivates successive-cyclic movement of possessors by the need to turn D into a proper governor. On the more recent approaches to movement (the Minimalist Program of Chomsky 1995), successive-cyclic movement is motivated by the need to check some uninterpretable formal feature (categorial, phi-feature(s), case). In the Minimalist framework, uninterpretable features vary in strength: strong features induce movement in the overt syntax prior to Spell-Out, while weak features induce covert movement after Spell-Out. It follows from the checking theory of movement that the parametric variability resides in the types and relative strength of features that can be associated with functional heads or lexical items.

Gavruseva proposes that in languages with possessor extraction (Hungarian, Chamorro, Tzotzil), the functional heads projecting a DP structure have strong uninterpretable features. The feature strength of the lower Agr/D is derived from its composite set of features: phi-features (person and number) and case. Tne first step of possessor movement is driven by the need to check these [- interpretable] features. Gavruseva proposes that the higher D is endowed with a strong categorial N/D-feature that is checked via the second step of possessor movement to Spec,DP. She further extends Szabolcsi's ideas by suggesting that successive-cyclic movement of possessors in the DP is required to take place in overt syntax for possessor extraction to be a grammatical option in a language. The availability of overt DP-internal successive-cyclic movement is a point of crosslinguistic variability. Thus, the Germanic data can be plausibly explained in the following way: possessor phrases do move to the higher DP, as suggested in Kayne (1993); however, this movement step takes place in the covert component due to the weakness of the categorial N/D-feature. This explanation implies that successive-cyclic movement in the overt component of syntax (prior to Spell-Out) is a crucial syntactic condition for extraction of DP possessors.

2 Experiment

2.1 Subjects

12 English-speaking pre-schoolers (9 females and 3 males) participated in the experiment. All children attended a day-care facility at the University of Maryland. The children's age range was 4;5-6;0 (average age 5;4).

2.2 Experimental Design and Methodology

The target structures were subject and object long-distance *whose*-questions, shown in (11):

(11) a. Whose fish do you think is in the cradle?
  b. Whose cat do you think Spiderman saved?

The control structures consisted of matrix object *whose*-questions and subject and object long-distance questions with bare wh-words and complex wh-expressions, shown in (12):

(12) a. Whose food did you like?
  b. Who do you think is in the box?
  c. How many stones do you think the baby has?

To elicit the target and control structures, we used an elicited production technique that engages children in a guessing game with a puppet (Crain & Thornton 1998, Thornton 1996b). An experimental set-up requires two experimenters. One experimenter acts out short stories with toy props, which create appropriate contexts for elicitation of investigated structures. The other experimenter plays a puppet character who hides while the stories are acted out and comes out at the end of each story to guess about things that happened. The child is asked to watch the stories and help the first experimenter to quiz the puppet. Before the child asks a question, he/she hears a lead-in statement given by the experimenter. Below we present a sample protocol and a sample lead-in:

Protocol:

In this story, we are going to have Grover, Cookiemonster and the Troll. Today they are going to a pet shop to get a pet fish for themselves. [The characters are shown to go to the make-belief pet shop]. They see three kinds of fish there. Grover says, "Wow, I like that blue fish, I think I'm gonna get it for myself! I like blue color." Grover takes the blue fish. Cookiemonster says, "I like that orange fish, it looks just like the cookie I'm eating." He comes up and pick up the orange fish. Then the Troll says, "I'm going to get that purple fish. It matches the color of my hair." [The Troll character has purple hair in the story]. Then they all say, "Great, let's go home." The three of them return home. "Now we need to put our fish in the water but we forgot to buy the fish tanks!". Grover says, "I'll put my fish in the cradle." He pretends to pour water into the cradle and puts his fish there. Cookiemonster says, "I'll put my fish in this big frying pan." He does the same. The Troll says, "I'll put my fish in this tin can." (End of the story.)

Lead-in statement:

(13) EXP: So we know that somebody's fish is in the cradle. But ask the puppet whose he thinks.[3]
Target: Whose fish do you think is in the cradle?

Each child participated in two thirty-minute elicitation sessions. The interval range between the two sessions was from two to three weeks. A typical experimental session consisted of six to eight short stories. Each child was given an opportunity to ask approximately 20 questions with *whose*-phrases during the two sessions.

3 Results

The discussion in this section will be organized as follows. We begin by presenting an overview of the results, focusing on the most general trends and patterns in child data. Then we will discuss how question forms were distributed in the individual child data.

---

[3] Some researchers pointed out to us that the use of an elliptical *whose*-phrase in the experimenter's statement may have biased the children to produce split *whose*-questions. We disagree with their point. We believe that the use of an elliptical wh-phrase is felicitous in this discourse context, especially with a short pause after 'whose', although we concede that an elliptical *whose*-phrase may have increased the processing difficulty of the experimenter's statement. We will further comment on the possible influence of the lead-in on the children's responses in section 3.2.

3.1 Questions with Extracted Wh-possessors

The main finding of the experiment is that 11 of the 12 tested children produced long-distance questions with an extracted wh-possessor. The most common extraction pattern featured a ‘bare’ wh-possessor in the matrix COMP and a stranded possessed NP in the embedded clause. Consider some of children's productions in (14) which illustrate possessor extraction from subject position (the possessive morpheme *-s* was pronounced on the verb *think*, as reflected in the transcription):

Extraction of ‘‘bare’ wh-possessors in subject questions:

(14) a. *Who* do you think *-s* [θIηks] *coin* is in the box?
(cf. Whose coin do you think is in the box?)
b. *Who* do you think *-s* [θIηks] *feather* is blue?
(cf. Whose feather do you think is blue?)

Some children also extracted a ‘bare’ wh-possessor from object position. Two object extraction patterns were found in the data. In one structure, a possessed NP was stranded in the base object position. In another structure, a possessed NP was stranded in the domain of the medial COMP. Consider the data in (15):

(15) a. *Who* do you think *-s* Spiderman saved *cat*?
b. *Who* do you think *-s sunglasses* Pocahontas tried on?[4]

---

[4] Some researchers pointed out that children's non-adult *whose*-questions may not be long-distance structures at all but matrix questions, with *who do you think* functioning as a possessor DP. On this approach, children's subject questions, like “*Who* do you think *–s fish* is in the cradle?” should be analyzed as in (i):

(i) [$_{CP}$ [$_{DP}$ Who do you think[$_{D}$ ‘s [$_{NP}$ fish]]] [$_{IP}$ is in the cradle]]?

There is evidence in our data that casts doubt on this approach. For example, if questions such as ‘*Who* do you think *-s sunglasses* Pocahontas tried on?” were in fact matrix questions, we would expect 4 to 6 year old children to produce them with the subject/aux inversion, as shown in (ii):

(ii) [$_{DP}$ Who do you think [$_{D}$ ‘s [$_{NP}$ sunglasses]]] *did* Pocahontas try on?

All children in our study had subject/aux inversion firmly acquired at the time of the experiment. However, none of them produced questions as in (ii).

Along with the patterns in (14-15), we attested a few questions in which *whose* was extracted. However, these questions were scarce in the data as compared to the questions with an extracted wh-possessor *who*. Consider the examples in (16):

(16) a. *Whose* do you think *ball* went in the cage?
b. *Whose* do you think *lunch* the baboon made?
c. *Whose* do you think *hat* is this, on the table?

In our discussion, we will refer to the question forms in (14-16) as *split whose-questions*, which we intend as a general descriptive term for the children's non-adult questions.[5]

3.2 Distribution of Split *Whose*-questions in Child Data

Let us now consider the distribution of the main split patterns in the individual child data. Recall that our prediction was that children should either produce pied-piped *whose*-questions or they should obligatorily extract a wh-possessor. The logic of the Subset Principle rules out optional possessor extraction as a child's initial hypothesis. The distribution of *whose*-questions in Table 3 below shows that only Mary (4;11), one of the youngest children in the study, consistently produced adult-like *whose*-questions. Two six-year olds, Matt and Mandy, produced only split *whose*-questions. The production data from these children were consistent with our predictions. The rest of the children produced both pied-piped and split *whose*-questions. Thus, the data from nine children do not support the prediction that English-speaking children should not go through a developmental stage at which a pied-piping option alternates with possessor extraction. Table 3 also shows that the split form containing *who* in COMP was more frequent in the data than the form containing *whose* (38% vs. 7%). Consider Table 3:

---

[5] There is evidence in the data that suggesting that *–s* on *think* (pronounced as *thinks* by the children) is indeed related to possessor extraction and is not some sort of an agreement error caused by the lead-in statement that contained an inflected verb *thinks* (see ex. 13). Recall that our experimental design included long-distance controls. Their elicitation also required the use of *thinks* in the lead-in. However, no child said *thinks* when producing questions as in 12(b,c).

Children	Extraction of *who*	Extraction of *whose*	Adult-like	Total	Other
Mandy	24	1	0	25	10
Gab	7	-	3	10	7
Sandra	8	-	8	16	16
Jane	6	1	4	11	48
Matt	3	1	0	4	41
Peter	4	1	1	6	46
Meg	3	-	17	20	7
Tori	2	4	9	15	14
Kate	1	1	10	12	14
Sage	1	-	8	9	22
Tonya	-	2	11	13	10
Mary	-	-	13	13	15
Total	59 (38%)	11 (7%)	84 (55%)	154	250

Table 3: Questions with extracted *who* and *whose* vs. adult-like questions.

What also needs to be noted about Table 3 is that there is a great deal of variation in the number of *whose*-questions produced by each child. The total number of *whose*-questions fluctuated in the individual child data because the children often responded with alternative question structures in response to the experimenter's lead-ins.[6] As a result, the actual number of *whose*-questions produced by some children is much lower than 20 (a targeted number in the experiment).[7]

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[6] The most common alternative responses to the lead-ins with *whose* consisted of matrix *whose*-questions and long-distance questions with other wh-words (e.g. *who*, *which N*, etc.). For example, instead of producing a target question, like "Whose bear do you think the witch stole?", the children responded with the structures as in (i):

(i) a. Who do you think the witch stole?
    b. Whose bear did he steal?

In Table 3, children's alternative responses are grouped under the category 'Other'.

[7] A low number of *whose*-questions produced by Peter (5;6), Matt (6;0), and Sage (5;2) may indicate that these children had greater difficulty in piecing together these questions from the experimenter's lead-in.

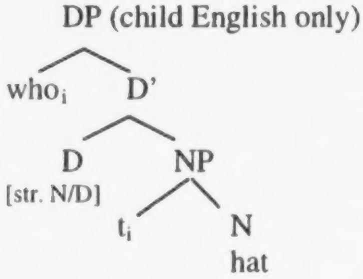
4 Analysis

In this section, we will address two issues: (a) the derivation of split *whose*-questions with *who* in the matrix COMP; (b) the syntactic status of the *–s* morpheme in the domain of the medial COMP.

4.1 Possessor Extraction in Child English

We suggest that children's split long-distance *whose*-questions are derived via extraction of the wh-possessor *who* from the DP. In a nutshell, our proposal is that *who* can extract in child English because the specifier of the DP can function as an A-bar peripheral position. Recall that on Abney's (1987) and Kayne's (1993) analyses, the Spec of DP in adult English is an A-position, where possessor noun phrases are marked for case. Abney assumes that possessors are base-generated in Spec,DP, whereas Kayne takes the Spec of DP to be a derived position headed by a [+definite] determiner. In section 1.3, we suggested that wh-possessors must move to an A-bar position, for extraction to be a grammatical option. To account for possessor extraction in child English, we appeal to the UG options and suggest that some English-speaking children's grammars allow possessives to project from a null determiner, much in the same way as in the grammars of Chamorro, Hungarian, and Tzotzil. On this approach, possessive phrases in child English may have the following underlying representation:

(17)



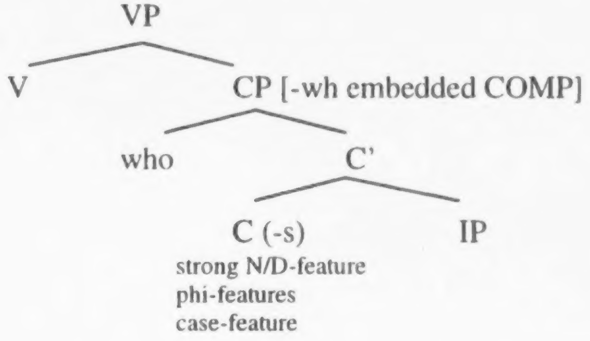
We follow Radford (1990) in assuming that possessor phrases in child English originate in the specifier of the possessed NP and undergo movement to the Spec,DP. However, unlike in adult English, the D head in (17) is not endowed with an uninterpretable case feature (say, [+genitive]), but rather bears a strong categorial [N/D feature] that propels overt possessor movement to the Spec,DP. The structure in (17) suggests that the difference between child and adult grammars is not in the structural representation of possessive phrases. Possessive phrases project to DP in the grammar of young children and adult speakers. Rather, the difference resides in the fact that some children utilize a UG option of projecting possessives from a null D. The strong N/D-feature on D triggers possessor movement to an A-bar position, consequently extraction out of the DP becomes a grammatical option. This reasoning implies that the wh-possessor *who* is drawn from the lexicon with a set of features, for example, [3rd person], [singular], [+genitive], [+wh], interpretable N-features, which need to be checked in the domain of the appropriate functional head. (17) shows that *who* checks only its N/D-features in the DP. The relevant question at this point is in what projections a wh-possessor *who* checks its case and phi-features (assuming that a [+wh] feature is checked in the matrix COMP).

4.2 The Status of the Morpheme –s in Split *Whose*-questions

This section aims to provide an analysis for the morpheme *–s* in the medial COMP domain of split *whose*-questions. The line of analysis that we developed for possessor extraction in child English left us with the question concerning a functional domain, where *who* can check its uninterpretable phi-features and a case feature. We propose that the embedded COMP in child English serves as such an alternative domain. The structure in (18) captures the details of our proposal:

Feature-checking in the medial COMP:

(18)



The structure in (18) shows that a wh-possessor *who* extracts successive-cyclically through the intermediate COMP, where it checks its uninterpretable features prior to Spell-Out. We follow Fanselow & Mahajan (1996) in suggesting that successive-cyclic movement through the embedded COMP is driven by the uninterpretable N/D-feature on the complementizer C. Since the N-features of nominals are [+interpretable], they can enter into a checking relation with the strong N/D-features on the functional heads more than once (Chomsky 1995), therefore a wh-possessor *who* is a good candidate for checking an N/D-feature on COMP. The morpheme –*s* on *think* should then be viewed as a morphological reflex of this feature checking operation. Thus, -*s* can be analyzed as a complementizer clitic that is spelled-out at PF on the matrix verb *think*.[8]

5 Concluding Remarks

One of the main findings of the experiment is that some English-speaking children go through a developmental stage which attests the knowledge of a less restrictive Grammar Type B (a Hungarian-type of grammar) that allows optional extraction of wh-possessor phrases. This developmental fact is not predicted by the Subset Principle that requires the choice of a more restrictive grammatical option on learnability grounds. Thus, on the face of it, the data suggest that the Subset Principle does not shape the developmental path of the acquisition of *whose*-questions. However, caution needs to be taken in interpreting the child data as evidence against the Subset Principle *per se*. One other possible interpretation of the results could be that the subset/superset relations is not the best way of capturing the differences in possessor extraction options between different grammar types. Although we did propose an account of possessor extraction that rests on one property of possessive phrases (namely, the availability of successive-cyclic movement in the DP), the crosslinguistic facts are more complex. The subset/superset relations may exist within a single language: in Hungarian, possessors obligatorily extract if D is null (Szabolcsi 1994); in German prepositional possessor phrases (as opposed to possessor-DPs) can be optionally extracted (Pafel 1995). Thus, an array of crosslinguistic differences in possessor extraction may not be reducible to a single feature value (strong vs. week N/D-feature). In the acquisition literature, however, the Subset Principle refers to the selection of a single, most restrictive parametric value by the child (Berwick 1985). Future acquisition research should shed more light on this issue by studying the development of questions with wh-possessives in children of various linguistic backgrounds.

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[8] This proposal echoes Thornton's (1995) analysis of the medial wh-questions (e.g. *Who* do you think *who* is in the box?) in that it argues that the steps of a successive-cyclic derivation can be overtly spelled-out in some English-speaking children's grammars.

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The Long-Distance Anaphora Conspiracy: The Case of Korean[*]

Kook-Hee Gill

1 Introduction

It has been generally observed (e.g., Li and Thompson 1976) that East-Asian languages such as Korean, Japanese and Chinese present a certain cluster of common features such as following:

1. Topic-orientedness
2. Double nominative constructions
3. Long-distance anaphora

Firstly, one of the long established characteristics of languages such as Chinese, Japanese, and Korean is their context dependence; or to put it in Li and Thompson's (1976) terminology, their "topic-orientedness." Unlike other pro-drop languages (e.g., those in the Romance family) empty pronouns in East Asian languages are licensed not by strong agreement but their ability to be identified via strong contextual or discourse features. Their second common feature, double nominative constructions, represents their ability to generate two subject positions. These languages also consistently exhibit long-distance anaphoric patterns (*ziji* in Chinese, *zibun* in Japanese, and *caki* in Korean). Even though each of these common features has been a widely discussed issue, their interaction has not been thoroughly investigated. In this paper, we will sketch the interaction of the first two features in order to account for the third one.

The relevance of contextual factors in accounting for long-distance anaphora has also been repeatedly stressed in the literature in various forms (Perspective (Iida 1996), Logophoricity (Sells 1987), or Point of View (Kuroda 1973, Banfield 1982, Zribi-Hertz 1989)). On the other hand, syntactic conditions such as the subjecthood condition which states that the Japanese long-distance anaphor *zibun* allows a subject antecedent, but not a nonsubject one (Kuroda 1965, Kuno 1973) have also been put forward for the explanation of

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Long-Distance Anaphora. It is not, however, always clear whether these conditions are proposed in order to replace the contextual ones or to be taken in conjunction with them. In this paper, we will propose an account for long-distance anaphora in more structural and *formal terms rather than depending* on the contextual factors. By reconsidering data in Korean, usually cited in favour of the contextual/discourse approach to long-distance anaphora, we will argue that the phenomenon can be best explained rather in terms of the interaction of the common properties of East-Asian languages: Topic-orientedness and Double Nominative constructions. That is, *caki*-binding in Korean in the relevant data is very closely related to topicalised constructions which, as we claim, are closely related to the null topic constructions and share the same underlying structure with the double nominative construction in Korean.

2 The Basic Facts and Previous Accounts

In this section, we will observe the basic phenomenon of long-distance anaphora, especially those that are central to the accounts highly dependent on the contextual factors. By way of examining those approaches to the basic facts, we will also outline the questions we would like to raise and try to answer in this paper.

The long-distance anaphor *caki* can take an argument antecedent across a number of clause boundaries (1a),[1] but can also be bound by a *Topic* in what at first appears to be a non-argument position which contravenes the A-binding requirement for anaphors.

(1) a. John$_i$-i Bill$_j$-ekey Mary$_k$-ka caki$_{i/*j/k}$-lul cohahanta-ko
John-NOM Bill-DAT Mary-NOM self-ACC like-COMPL
malhayssta
told
'John$_i$ told Bill$_j$ that Mary$_k$ likes self$_{i/j/k}$'

b. John$_i$-un ttal-i caki$_i$-pota ki-ka te kuta
John-TOP daughter-NOM self-than height-NOM more is tall
'As for John$_i$, his daughter is taller than self$_i$'

---

[1] We will not discuss the examples like (1a) where the anaphor is bound by the antecedents locally or in a higher clause, for which case, a number of syntactic and non syntactic approaches are proposed. Rather, in this paper we will focus on the examples which are known to be subject to some discourse factors.

c. John$_i$-**un caki**$_i$-ka ka-ss-ta
John-**top self**-NOM go-PAST-DSE
'**As for John**$_i$, **self**$_i$-NOM went'

(1b) and (1c) show the case where a topic-marked noun phrase antecedes *caki*. The difference between the two is that in the former, *caki* occurs as a complement of the A and in the latter as a genitive-marked element within the subject NP. These examples are often considered as a case of discourse binding with an emphasis on the discourse functions of topic (see Huang 1984).

There is also a set of data which has been provided as the evidence of the discourse based account of long-distance anaphora. The following is one of those examples in Korean:

(2) A. Mary$_i$-ka ku pati-e kass-ni anim tarun salam-i taysin
Mary-NOM the party-to went-Q or other person-NOM instead
kass-ni?
go-Q
'Is it Mary$_i$ who went to the party or somebody else instead?'

B. Ani, **caki**$_i$-ka kasse
No, **self**$_i$-NOM went
'No, **self**$_i$ went'

(2) illustrates an exchange between two speakers A and B. In A's utterance, *Mary* is mentioned and remains a prominent topic throughout the exchange. In B's utterance, *caki* occurs without any overtly expressed antecedent in its own sentence. As the indexing indicates, *caki* is anteceded by *Mary*. This sort of example has been cited in most of the literature as a case of discourse binding (Huang 1984, Ueda 1984). In fact, *caki* in (2) looks as if it was bound in discourse. In other words, with no possible antecedent available in its own sentence, it looks for its antecedent in the previous discourse. In this case, *caki* is bound by the prominent topic *Mary* in the discourse which is introduced by the subject in the initial utterance (A).

The reason that discourse binding applies to these examples is that *topic* is viewed as a discourse function interpreted as what is being talked about or what is presupposed or understood by *the speaker*. This definition of topic is well suited for the notion of *Perspective* or *Point of View* used in the discourse based accounts of long-distance anaphora. However, this type of account describes rather than explains data. One would like to have a formal account of how the prominent topic or the level of prominence of any given topic is formally represented in order to disambiguate and decide amongst several possible topic antecedents. This is particularly obvious in the following situation:

(3) A. Mary-ka pati-ey ka-ss-ni? anim John-i ka-ss-ni?
Mary-NOM party-to go-PAST-Q or John-NOM go-PAST-Q
'Did Mary go to the party or is it John who went to the party?'

B. ***Caki**-ka ka-ss-e
self-NOM go-PAST-DC
'**Self** went'

(3) has the same structure as (2) except that in (3), *John* replaces *tarun salam* 'other person'. When there are two equally prominent entities in the discourse such as *Mary* and *John* in (3), *caki* in B's reply is not licensed. If *caki* is indeed bound by a prominent entity in discourse according to discourse approaches, then *caki*-binding should be licensed having either *Mary* or *John* as the antecedent. Unless such accounts can provide a good explanation for the ungrammaticality of B in (3), it is hard to see that the binding relation is completely dependent on the discourse. Furthermore, even if discourse approaches can deal with instances like (3), a superior account would be one which can be concretely formalised so that a legitimate antecedent can be clearly visible in relation of *caki* in some formal level, rather than leaving the prediction of the correct antecedent to the discourse context. Given this, the question we would like to ask is simple:

- Can we reduce the explanation of the phenomena to a structural account?

The answer we suggest in the next section will involve the following:

- There always exists a topic phrase either overt or covert that binds the long-distance reflexive *caki*
- The binding in such context is licensed only in double nominative constructions (DNC)

3 Topic Binding in Double Nominative Constructions

The most fundamental hypothesis is that a syntactic topic, be it overt or not, is always available and provides the, or one of the, appropriate binders of *caki.* Furthermore, we claim that this topic constituent is licensed in double nominative constructions. On the basis of this hypothesis, the actual structure of (2) is illustrated as below:

(4) A. Mary$_i$-ka ku pati-e kass-ni anim tarun salam-i taysin
Mary-NOM the party-to went-Q or other person-NOM instead
kass-ni?
go-Q
'Is it Mary$_i$ who went to the party or somebody else instead?'

B. Ani, [**e**$_i$]$_{top}$ **caki**$_i$-ka kasse
No, **self**$_i$-NOM went
'No, [**e**$_i$]$_{top}$ **self**$_i$ went'

In B of (4). the topic phrase is shown to bind *caki* and it is not overt. Assuming that this is a correct representation, the question of licensing of this topic remains to be answered. We propose that the licensing of this topic is closely linked to the double nominative constructions. It is well known that Korean and Japanese allow two nominative marked NPs to occur with a one place predicate.

(5) a. John-i/un ton-i issta
John-NOM/TOP money-NOM exist
'John has money'

b. Mary-ka/nun meri-ka norahta
Mary-NOM/TOP hair-NOM yellow is
'Mary's hair is yellow'

c. LA-ka/nun hankukin-i manhta
LA-NOM/TOP Korean-NOM many
'LA has many Koreans'

As shown in (5), the first nominative nominal can be readily topic-marked with '*-nun*'.[2] The outer nominative can be considered an argument of the complex predicate created by the combination of the inner nominative and the core predicate, very much like the topic-comment relation holding between a sentential topic and the rest of the sentence (Heycock and Lee 1990). Combining now the two observations made above, we propose that sentences where *caki* occurs without an overt antecedent are underlyingly double nominative constructions.

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[2] If the second nominative nominal is marked with '*-nun*', it gives a reading of the contrastive focus (Choi 1996). Also note that in double nominative constructions the order of the two nominals is rigid, for instance, the scrambling of the two nominals is not allowed (Yoon 1987).

This proposal however is not, as it stands, really dependent on these sentences being double nominatives.[3] There is however evidence which clearly suggests that this is indeed the case. This evidence comes from the range of semantic relations that must hold between the topic that we postulate and the rest of the sentence, and the ones holding between the outer nominative and the derived predicate of which it is an argument.

The relations in question are precisely the ones of alienable possession (5a), inalienable possession (5b), part-whole (5c) and identity which are the only ones that occur between the outer and inner nominative in a double nominative construction.[4] As for the examples we have seen for *caki*-binding, the relation in (1b) is *alienable possession,* the relation in (1c) is *identity,* which is the same in B of (2). And also observe other corresponding example involving *caki*:[5]

(6) *Inalienable possession relation*
Mary$_i$-nun meri-ka caki$_i$ ekkay-kkaci tahnunta
Mary-TOP hair-NOM self shoulders-upto reach
'As for Mary$_i$, (her) hair reaches to self$_i$'s shoulders'

It then follows from the above that topic binding of *caki* can only occur in a double nominative construction.

Moreover, in the following example, as an answer to the question in (2), *caki* cannot be topic-marked itself:[6]

(7) B′. *Ani, caki$_i$-**nun** kasse
no, self-TOP went

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[3] It could very well be that a phonologically null topic is simply present in the structure.

[4] It should be noted that the relations we refer to here are to be distinguished from, namely, *'aboutness relation.'* The aboutness relation is generally known to hold between a topic phrase and the following clause, whereas the relation in our discussion holds between the two nominals in double nominative constructions.

[5] As for the part-whole relation, it normally involves inanimate nominative nominals, thus, it is hard to find a context where the animate nomimals involved in this relation appear to bind *caki.*

[6] This is only relevant to gapless topic constructions like those discussed in this paper. In gapped topic constructions, *caki* may be topic-marked. For the details of the two kinds of topic constructions in relation to *caki*-binding, see Moon (1994), Gill (1998). For the discussion of *caki*-binding especially in gapped topic constructions, see Gill (Forthcoming).

In a discourse approach, this example will not differ from B in (2) and there is no way of explaining the ungrammaticality of (7). However, in our hypothesis, the answer is rather straightforward. *Caki* being a topic itself, it cannot be entitled to have another topic phrase available by the condition that Korean allows only one topic per sentence (Moon 1994, Chang 1995). Thus, there is no possible antecedent (no possible topic phrase) to bind *caki.* Its ungrammaticality also shows that *caki* in (7) cannot look for its possible antecedent beyond the sentential level, that is, it cannot take any discourse antecedent.

Furthermore, given that these relations must hold in double nominative constructions, the ungrammaticality of cases where a topic phrase inappropriately occurs, predicting wrong binding patterns as in (8), is immediately explained away with no further stipulation (e.g., (8) cannot be seen as a double nominative construction because the relation between the two nominals *John* and *Bill* does not suit any of the relations for two nominative nominals in double nominative constructions):

(8) *John$_i$-un Bill-i ku chayk-ul caki$_i$-ekey cwuessta
John-TOP Bill-NOM the book-ACC self-DAT gave
*'As for John$_i$, Bill gave the book to self$_i$'

To sum up, we argue that the binder for *caki* in (4) is not a topic in discourse, but actually a phonetically unrealised topic which originates in the outermost nominative position licensed in an double nominative structure, in other words the topic that binds *caki* in these instances is always in a legitimate argument position. The central evidence for this approach is twofold; syntactically it comes from the otherwise unexplained fact that *caki* can never be topic-marked itself, which suggests that when *caki* occupies the topic position, there is no available position that could be occupied by a potential antecedent. This also implies that *caki* cannot take an antecedent in the discourse domain, but only a sentence-internal antecedent. Furthermore, we have seen that in order for *caki*-binding to be licensed, the topic phrase seems to have a particular relation with a subsequent nominal and this is precisely the ones holding between the two nominals in double nominative constructions. Thus, this indicates that *caki*-binding in this case licensed in the double nominative constructions and the topic phrase is actually licensed in the position of the outer nominal. This confirms again that the topic phrase we postulate as an antecedent of *caki* is a syntactic one.

4 Topic-Orientedness and the Expression of Topics

The last question that remains is what allows the topic not to be expressed as in (4). The answer is related to the topic-orientedness of Korean. In a highly discourse oriented language like Korean, topic phrases are very often suppressed in sentences subsequent to the first occurrence of the topic in the discourse. Consider the following examples:

(9) A. Yong-i nuwku-hako ssawa-ss-ta-ko?
Yong-NOM who-with fight-PST-DC-Q
'Who did you say Yong fought with?'

B. Heyn-hako-yo
Heyn-with-PO
'With Hyen' (Chang 1995, p.200, ex.57(c-d))

Given the topic *Yong* in the initial dialogue A in (9), B's reply is elliptical: the topic elements are not repeated. And once the topic is introduced in an unstressed form, it is suppressed in the subsequent utterance or realised in a pronominal form. Otherwise, the same topic is repeated as shown below:

(10) Mia-nun ko-sam-i tway-yo.
Mia-TOP high-three become-SE
Nay-nyen-ey (kaya-nun/Mia-nun) tayhak-ey ka-yo.
next-year-at she-TOP/Mia-TOP college-to go-SE
Kulayse (kyay-nun/Mia-nun) Yelsimhi Kongpwuha-ko iss-e-yo
So she-TOP/Mia-TOP diligently study-ing iss-PO-DC
'Mia becomes a high school 3rd grader. She goes to college next year. So she is studying hard' (Chang 1995, p.200, ex.58)

In the above discourse setting, *Mia* is the topic in the first sentence. It continues to be the topic and it is realised by zero or the pronominal *kay-nun* 'child/she'. More importantly, the only case where the topic is obligatorily overt is when there exists some ambiguity of the topic (when there are more than one prominent topics in the given context), when the topic has been just changed from the previous one or when there is a need to reintroduce the topic for clarification. Given this, we can now explain the ungrammaticality of B in (3). In (3), *Mary* and *John* can be equally prominent in the context, in which case the reply of B should express the topic explicitly to clarify which one he/she is talking about. Despite this, the topic is still not expressed explicitly. Without such overt topic phrase, *caki*-binding cannot be licensed.

The failure of licensing *caki*-binding can be also found when there is more than one prominent topic in the discourse and when the topic is not properly reintroduced to disambiguate between those prominent topic. Such a case can be shown in (3) we saw above, where *Mary* and *John* are equally prominent in discourse and the reply of B failed to reintroduce a proper topic to disambiguate between the two, thus *caki*-binding is not properly bound. All the more, topic being a pronominal element of a particular kind, it disallows split antecedents.[7] In this way, the chain of an overt or covert topic is rather systematic. Understanding this chain of the topics, which is structurally accommodated by double nominative constructions, provides a rather neat way of predicting the observed binding patterns.

5 HPSG Approach

In the last section, we saw that the outer nominal can take the topic marker *-nun* as well as the nominative marker. It may be argued that the topic-marked nominal should not be included in the argument structure, as *topic* is not a selected argument. For example, Yoon (1987) argues that the DNC should be analysed as a gapless topic/focus construction such that the outer nominal may be licensed by the same principles that license *as for* phrases and other parentheticals in English. In fact, the analysis of the outer nominal as a pure topic is not uncontroversial. There is plenty of evidence that the outer nominal has legitimate argument status (see, for examples, Doron and Heycock (1999)). Our view of DNC is in line with the latter and the outer nominal is treated as a subject member of ARG-ST. The fact that it occurs in the left most position identifies it as the most prominent element as is common in other languages. This simply explains why the nominative case of the outer nominative nominal can freely alternate with the topic marker as shown in (5).

In this paper, we adopt the hypothesis of Manning (1996) and Manning and Sag (1998) that binding principles are stated on a level of syntacticized argument structure. On the basis of this, the constraint on double nominative constructions is presented as follows:

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[7] Perhaps the pronominal in question is akin to PRO, which also needs to be bound and cannot take split antecedents. However, we will leave that issue open for the time being.

(11) DOUBLE NOMINATIVE CONSTRUCTION LEXICAL RULE

$$\begin{bmatrix} \text{VAL} & \begin{bmatrix} \text{SUBJ} \left\langle \boxed{3}\text{NP}_{\boxed{4}} \right\rangle \end{bmatrix} \\ \text{ARG-ST} & \left\langle \boxed{3}\text{NP}_{\boxed{4}} \right\rangle \oplus \left(\left\langle \boxed{5} \right\rangle \right) \end{bmatrix} \Longrightarrow$$

$$\begin{bmatrix} \text{VAL} & \begin{bmatrix} \text{SUBJ} \left\langle \boxed{1}\text{NP}_{\boxed{2}}, \boxed{3}\text{NP}_{\boxed{4}} \right\rangle \end{bmatrix} \\ \text{CONT} & \begin{bmatrix} \text{R} \left\langle \text{NP}_{\boxed{2}}, \text{NP}_{\boxed{4}} \right\rangle \end{bmatrix} \\ \text{CONX} & \begin{bmatrix} \text{TOPIC } \boxed{1}\text{NP} \end{bmatrix} \\ \text{ARG-ST} & \left\langle \boxed{1}\text{NP}_{\boxed{2}}, \boxed{3}\text{NP}_{\boxed{4}} \right\rangle \oplus \left(\left\langle \boxed{5} \right\rangle \right) \end{bmatrix}$$

As for the basic mechanism of this lexical rule, the input of the rule should take a lexical entry with a single subject (indicated by $\boxed{1}$), which returns the output with the two subjects ($\boxed{1}$ and $\boxed{3}$) resulting in double nominative constructions. Also, the ARG-ST of the input shows that it takes one subject as an argument and this is followed by an appending list of other arguments ($\boxed{5}$) if any, whereas, he ARG-ST of the output, then, has two subjects. What DNC states for long-distance anaphora is that Double Nominative Constructions can be licensed only if they satisfy the semantic and discourse constraints for the two nominative-marked nominals to take a appropriate position in the ARG-ST in order to constitute legitimate binders for *caki.* The CONT attributes checks the appropriate semantic relation between the two nominatives, that is, inalienable, relational possession, identity etc., which we will refer to as R-relations. At the same time, the CONX attribute indicates what the prominent element in the discourse is. That is, the CONX has a topic feature whose value should be instantiated with a prominent element in the given discourse or an element provided as a topic explicitly with *nun* making. With these two features appropriately satisfied, the two nominals are placed as the first elements in the ARG-ST. These positions guarantee that the two nominative nominals will be the optimal binder of *caki.* More importantly, however, it is only when the topic value is explicitly provided that the outer nominal is allowed to be covert. The covert element can be understood as an empty pronominal which can be recovered through a given context in languages that freely allow pro-drop and lack a rich inflectional system like Korean.[8] Thus, the ungrammaticality of

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[8] This, however, should not be understood as a missing element or a *gap* as that of Sag (1997).

(12) below is due to the fact that the topic is underspecified, and the outer nominal is covert.

(12)* Caki-ka kasse
Self-NOM went
* 'Self went'

(13)

$$*\begin{bmatrix} \text{VAL} \begin{bmatrix} \text{SUBJ} \left\langle \boxed{2}\text{NP}_{\boxed{3}ref} \right\rangle \end{bmatrix} \\ \text{CONT} \begin{bmatrix} \text{R} \left\langle [\,],\ \text{NP}_{\boxed{3}} \right\rangle \end{bmatrix} \\ \text{CONX} \begin{bmatrix} \text{TOPIC} \langle\rangle \end{bmatrix} \\ \text{ARG-ST} \left\langle \text{PRO},\ \boxed{2}\text{NP}_{\boxed{3}ref} \right\rangle \end{bmatrix}$$

Furthermore, as the outer nominal is covert there is no way of ensuring that the DNC-relevant relations (R-relations) are properly satisfied.

Turning back to (12), observe that it becomes fully grammatical when a context where a topic can be identified is supplied, as is also the case for (4), whose feature structure is illustrated in (14):

(14)

$$\begin{bmatrix} \text{VAL} \begin{bmatrix} \text{SUBJ} \left\langle \boxed{3}\text{NP}_{\boxed{2}} \right\rangle \end{bmatrix} \\ \text{CONT} \begin{bmatrix} \text{R} \left\langle \text{NP}_{\boxed{2}},\ \text{NP}_{\boxed{2}} \right\rangle \end{bmatrix} \\ \text{CONX} \begin{bmatrix} \text{TOPIC}\ \boxed{1}\text{NP} \end{bmatrix} \\ \text{ARG-ST} \left\langle \boxed{1}\text{PRO}_{\boxed{2}},\ \boxed{3}\text{NP}_{\boxed{2}ref} \right\rangle \oplus \boxed{5}\text{NP} \end{bmatrix}$$

In this case, even though the outer nominal is covert, there is a contextual back-up which allows the recovery of the content of the missing element as indicated in $\boxed{1}$. With the outer nominal properly identified, the CONT attribute indicates that the two nominals are in a proper R-relation. Furthermore, on the basis of the DNC lexical rule, the example in (8) we observed earlier is straightforwardly explained. In (8), the topic maker is licensed only from DNC constructions and the first two nominals *John* and *Bill* do not hold any of R-relations. Therefore DNC is not licensed, let alone any caki-binding.

6 Conclusion

In this paper, we have looked closely at the data of long-distance anaphora, which have been widely treated by discourse accounts, and tried to reduce the explanation of the phenomena to a more formal and structural account. We have argued that the data in question is an instance of topic binding where the topic phrase is licensed in an outer nominative nominal position in double nominative constructions. Also, exploiting the fact that Korean is a highly topic oriented language, the topic antecedent of *caki* can be either covert and not be repeated, or overt to disambiguate or reintroduce a topic. This proves to be adequate to predict a correct binding relation, and furthermore, having been implemented in HPSG, it turns out to be a more formal account in comparison to discourse approaches.

In conclusion, we brought together a set of seemingly unrelated properties of a particular set of languages under a special mode of interaction of the syntactic, semantic and pragmatic components of linguistic theory and showed that this set of properties instead of being a mere curious and interesting set of "areal features" in fact represents a tightly knit network and one of the best (perhaps the optimal) solution to the long-distance anaphora question.

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Topic, Focus, and the Grammar-Pragmatics Interface[*]

Jeanette K. Gundel

1 The Problem

In the introduction to her classic paper on topic, Reinhart (1982) writes: "Although the subject matter of pragmatic theory is ostensibly linguistic communication, much of it deals, in fact, with the more general problem of human interaction, which is independent of linguistic considerations and of which linguistic communication is just a particular manifestation. Thus, as Grice points out, his principle of cooperation holds equally for rational conversation and for baking a cake. Sentence topics, by contrast, are a pragmatic phenomenon which is specifically linguistic."

I agree with Reinhart that sentence topic is a specifically linguistic phenomenon. But I will propose in this paper that it is not primarily a pragmatic or discourse phenomenon as Reinhart and others have assumed. It is an integral part of the semantic/conceptual representation of natural language sentences, which is encoded (though not always unambiguously) by their morpho-syntactic and/or phonological form. The fact that topic-comment structure contributes to the way sentences are processed and interpreted in context, and thus constrains the appropriate contexts for a given sentence, doesn't necessarily distinguish this notion from other aspects of the meaning of sentences. The important question then isn't whether some particular linguistic phenomenon has pragmatic effects or not, but which of its properties are determined by the grammar and which can be derived from more general cognitive and communicative principles. Much of what I will have to say in this paper isn't new, but I hope that reformulating the question in this way will shed new light on some old controversies, if not resolve them.

2 Some History

Chomsky (1965: 163) notes "the extensive discussion (in traditional grammar as well as psychology) of the distinction between the 'grammatical' Subject and Predicate of a sentence and its 'logical' or 'psychological' Subject and Predicate." Chomsky cites one such example from Cook Wilson, who writes (1926, pp. 119f.) "...in the statement 'glass is elastic,' if the matter of inquiry was elasticity and the question was what substances possessed the property of elasticity, 'glass' ...would no longer be subject, and the kind of stress which fell upon 'elastic' when glass was the subject would now be transferred to 'glass.' Thus in the statement '*glass* is elastic,' 'glass,' which has the stress, is the only word which refers to the supposed new fact in the nature of elasticity, that it is found in glass...[and therefore]...'glass' would have to be the predicate...Thus the same form of words should be analyzed differently according as the words are the answer to one question or another, and, in general, the subject and predicate are not necessarily *words* in the sentence, nor even something denoted by words in the sentence."

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[*] This paper is an expanded version of an essay submitted to the Chomsky birthday celebration website (http://mitpress.mit.edu/celebration.) I would like to thank Antoin Auchlin and Ellen Prince for helpful comments on earlier versions.

Chomsky concludes that "whatever the force of such observations may be, it seems that they lie beyond the scope of any existing theory of language structure or language use."

A few years later, Chomsky (1971), (and around the same time Jackendoff 1972) opens the way towards bringing such issues within the scope of generative grammar. Chomsky notes that a sentence like (3) (intonation center marked by uppercase letters) has three possible interpretations, each expressing a different presupposition, depending on which constituent containing the intonation center is interpreted as the 'focus'. Sentence (4), on the other hand, has only one possible interpretation, and this is different from any of the interpretations available for (3). Each possible focus interpretation determines a different type of answer. Correspondingly, if (3) and (4) were declarative sentences, they would be responsive to different *wh*-questions (implicit or explicit).

(3) Did the Red Sox play the YANKEES? (Chomsky 1971)

PRESUPPOSITION	FOCUS	POSSIBLE RESPONSE
the RS played someone	the Yankees	No. The Tigers.
the RS did something	played the Yankees	No. They had the day off.
something happened	the RS played the Yankees	No. Bill had the flu.[1]

(4) Did the RED SOX play the Yankees?

PRESUPPOSITION	FOCUS	POSSIBLE RESPONSE
Someone played the Yankees	the Red Sox	No. (it was) the Tigers

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[1] For example, as an answer to "Why didn't you come to the party? Did the Red Sox play the Yankees?"

The presupposition-focus interpretations of (3) and (4) can be reformulated as different topic-comment interpretations, as in (3') and (4') respectively. [2] Thus, on the interpretation where only the phrase *the Yankees* is in focus, the topic is who the Red Sox played (alternatively, the ones who the Red Sox played) and the comment is that this was the Yankees. On the reading where focus is the whole VP/IP constituent *play the Yankees*, the topic is the Red Sox, or what the Red Sox did, and the comment is that they played the Yankees. And on the reading where the whole sentence is focus, the topic is something not overtly represented in the sentence at all, possibly what happened at a particular time and place (cf. Gundel 1974/89), Erteschik-Shir 1997) and the comment is that the Red Sox played the Yankees. Note that the comment is the main predication, and thus the scope of what is being questioned in each case.

(3') Did the Red Sox play the YANKEES?

TOPIC/THEME	COMMENT/RHEME
(the ones) Who the Red Sox played	(x is) the Yankees
The Red Sox/ what the RS did	(x is) played the Yankees
??/ time x, place y	the Red Sox played the Yankees

In (4), on the other hand, we get only a single interpretation, where the topic is (the one) who played the Yankees, and the comment is that this is the Red Sox.

(4') Did the RED SOX play the Yankees?

TOPIC/THEME	COMMENT/RHEME
(the ones) who played the Yankees	(x is) the Red Sox

Extensive research on topic-comment, presupposition-focus, and related concepts in the past three decades has clearly established their relevance for theories of language structure and use. But terminological confusion abounds, and there is still no agreement on what the conceptual primitives are and how they are related. Moreover, while it is customary to use labels like 'pragmatics' and 'discourse' in characterizing these concepts, relatively little attention has been devoted to actually distinguishing their grammatical properties from properties attributable to more general pragmatic principles.

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[2] In Gundel 1974/89, I argued that the presupposition-focus distinction can be reduced to the topic-comment distinction. The two concepts have generally been treated as independent in most of the generative literature, however.

3 Two Kinds of Givenness/Newness

Much of the confusion surrounding these issues has resulted from conflating two types of givenness/newness (see Gundel 1988, 1994)[3]. One type is referential; it involves a relation between a linguistic expression and a corresponding non-linguistic entity in the speaker/hearer's mind, the discourse, or some real or possible world, depending on where the referents or corresponding meanings of these linguistic expressions are assumed to reside. Some representative examples of referential givenness/newness concepts include existential presupposition (e.g. Strawson 1964), various senses of referentiality and specificity (e.g. Fodor and Sag 1982, Enç 1991), the familiarity condition on definite descriptions (e.g. Heim 1982), the activation and identifiability statuses of Chafe (1987) and Lambrecht (1994), the hearer-old/new and discourse-old/new statuses of Prince (1992), and the cognitive statuses of Gundel, Hedberg and Zacharski (1993).

The second type of givenness/newness is relational. It involves two complementary parts, X and Y, of a linguistic or conceptual representation, where X is given in relation to Y, and Y is new in relation to X. Included here is the notion of logical/psychological subject and predicate described in the Cook Wilson quote above, as well as such well known information-structural pairs as presupposition-focus (e.g. Chomsky 1971, Jackendoff 1972), topic-comment (e.g. Gundel 1974/89), theme-rheme (e.g. Vallduvi 1992), and topic-predicate (Erteschik-Shir 1997).

Referential givenness/newness and relational givenness/newness are logically independent, as seen in the following example from Gundel 1980.

(5) A. Who called? B. Pat said SHE called.

If *SHE* refers to Pat, it is referentially given in virtually every possible sense. The intended referent is presupposed, specific, referential, familiar, activated , in focus, identifiable, hearer-old, and discourse-old. But the subject of the embedded sentence is at the same time relationally new, and therefore receives a high pitched accent here. It instantiates the variable in the relationally given, topical part of the sentence, x called, thus yielding the new information expressed in (5B).

The two kinds of givenness/neweess also differ in other important respects. First, with the exception of Prince's notion of discourse-old/new, referential givenness/newness notions are not specific to linguistic expressions. Thus, one can just as easily characterize the representation evoked by a non-linguistic visual or auditory stimulus , e.g., a house or a tune, as familiar or not, in focus or not, and even specific or not. By contrast, concepts like topic-comment, presupposition-focus, psychological/logical subject and predicate can only apply to linguistic expressions, specifically sentences or utterances and their interpretations.

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[3] Lambrecht 1994 is a notable exception here.

Corresponding to this essential difference, is the fact that referential givenness statuses like 'familiar' or 'in focus' are uniquely determined by the context at a given point in the discourse. The speaker chooses what she wants to refer to, or whether she wants to refer at all; but once this choice is made, the particular givenness status for the addressee is already predetermined by the context of utterance. Relational givenness notions like topic-comment, on the other hand, may be constrained by the context (as all aspects of meaning are in some sense); but, as the Czech linguist Peter Sgall pointed out a number of years ago, they are not uniquely determined by it. For example, a sentence like *There was a baseball game last night* could be followed by *The Yankees beat the RED SOX* or by *The Red Sox were beaten by the YANKEES.* While the latter two sentences could each have an interpretation where the whole sentence is a comment on the situation established by the preceding utterance, it is also possible in exactly the same context to interpret the first of these sentences as a comment about the Yankees and the second as a comment about the Red Sox. Which of these possible interpretations is the intended one depends on the interests and perspective of the speaker.

One place where the context determines a single topic-comment or presupposition-focus structure is in question-answer pairs , which is why these provide the most reliable contextual tests for relational/newness concepts, as in (3)-(4) and (3')-(4') above. Thus, (6b) would be an appropriate answer to the question in (6a), but (6c) would not be.

(6) a. Who did the Red Sox play?
b. The Red Sox played the YANKEES.
c. #The RED SOX played the Yankees.
d. #I love baseball.

It is important to note, however, that questions constrain other properties of the answer as well. Thus, (6d) is no more appropriate as an answer to (6a) than (6c) would be. The exact source of the inappropriateness may be different, but the point is that questions severely constrain **all** aspects of the semantic-conceptual content of an appropriate answer. The fact that appropriateness of a sentence as a response to a given question varies depending on location of the intonation center simply shows that sentence intonation codes a semantic-conceptual distinction. It does not necessarily make the distinction coded by intonational focus any more 'pragmatic' or 'discourse-dependent' than other aspects of the interpretation of natural language sentences.

The question that naturally arises for both types of givenness/newness, is how many different concepts are linguistically relevant in each category, and how are they relevant? This question has been addressed for referential givenness in Gundel, Hedberg and Zacharski 1993, and I will not be concerned with it further here. My main concern in the present paper is with relational givenness. The difference between 'topic-comment' and 'theme-rheme appears to be mainly terminological, 'theme-rheme' being favored in the European linguistics tradition, and 'topic-comment' in the American. While specific accounts differ as to whether these are to be defined on syntactic, semantic, or separate information structural levels of representation, both concepts essentially capture the logical/psychological subject-predicate distinction referred to in the Chomsky quote in §2. If the focus-presupposition distinction is reformulated as the topic-comment distinction, in the manner suggested in (3') and (4') above,[4] we are left with a single linguistically relevant relational givenness-newness concept. Reformulating the presupposition-focus distinction in this way makes it possible to capture the two complementary parts on the same level of description. Focus and presupposition, as these have generally been conceived in the literature, are not constructs of the same kind. Focus, though it has a semantic/pragmatic value, is defined on syntactic structures, while presupposition is a purely interpretive notion. So while the focus-presupposition distinction is intuitively clear, and may work well for descriptive purposes, an adequate theoretical account would need to invoke a more appropriate complementary pair in any case.

4 Referential Properties of Topic

While referential and relational givenness/newness are separate and logically independent notions, there is evidence that they are connected empirically, the relationally given component of a proposition, the topic, being in some sense referentially given as well. This fact has no doubt contributed to the terminological and conceptual confusion. Virtually the whole range of possible referential givenness conditions on topics has been suggested, including presupposition, familiarity, specificity, referentiality, and focus of attention. Some of the more well-known facts which indicate a connection between topicality and some kind of referential givenness have to do with the 'definiteness' or 'presupposition' effect of topics. For example, it has often been noted (e.g. by Kuno 1972, Kuroda 1965, inter alia) that the phrase marked by a topic marker in Japanese and Korean, necessarily has a 'definite' (including generic) interpretation. Thus, in (7), where the subject phrase is marked by the nominative marker *ga*, both the subject and the object can have either a definite or indefinite interpretation. But in (8) , where the subject is followed by the topic marker *wa*, it can only be interpreted as definite.

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[4] I have in mind here only the notion of focus as a complement to presupposition, not focus as contrast (e.g. Rooth 1985) or as 'what the speaker wants to call the addressee's attention to (Erteschik-Shir 1997). See Gundel 1998 for discussion of different senses of the term 'focus'.

(7) Neko ga kingyo o ijit-te ......
cat NOM goldfish OBJ play with-and
"The/A cat is playing with the/a goldfish, and..."
(8) Neko wa kingyo o ijit-te
cat TOP goldfish OBJ play with-and
"The/*A cat is playing with the/a goldfish, and..."

Similarly, in prototypical topic-comment constructions like those in (9)-(13), the topic phrase adjoined to the left of the clause is definite.

(9) My sister, she's a High School teacher.
(10) That book you borrowed, are you finished reading it yet?
(11) My work, I'm going crazy. (Bland 1981)
(12) The Red Sox, did they play the Yankees?

Dislocation of indefinites is generally disallowed unless it can have a generic interpretation, as illustrated in (13) (from Gundel 1988).

(13) a. The window, it's still open.
b. *A window, it's still open.

Note that the unacceptability of (13b) cannot be attributed to the fact that the definite pronoun has an indefinite antecedent, as the discourse in (14) is perfectly acceptable.

(14) We can't leave yet. A window is still open. It's the one in your bedroom

In Gundel (1985) I proposed a condition on topics which states that their referents must be already familiar to the addressee. This restriction was intended as a necessary condition, not a sufficient condition or definitional property. Formulated in terms of the cognitive status proposed in Gundel, Hedberg and Zacharski 1993, an entity is familiar if the addressee can be assumed to have an existing representation of the referent in memory Assuming that indefinites don't generally code familiar entities (unless they are interpreted generically) , the familiarity condition on topics provides a principled explanation for facts like those in (6)-(13) without restricting topics to discourse-old or salient entities.[5] It also captures, in more overtly cognitive terms, Strawson's insight that only topical definites carry an existential presupposition.

The examples in (7)-(13) provide support for the familiarity condition on topics only to the extent that the constructions in question can be assumed to mark topics. These assumptions, though widely held, are not totally uncontroversial. For example, Tomlin 1995 argues that Japanese *wa* is not a topic marker, but a 'new information' marker. Tomlin's arguments are based primarily on experimental evidence and the observation that *wa* is typically used to mark noun phrases referring to entities that are 'new' in the sense that they are not currently salient in the discourse. This is at best a tendency, however. It is not an absolute restriction. More importantly, Tomlin's argument rests on a confusion between referential and relational givenness and, specifically , on the assumption that topics are necessarily given in the sense of being the current focus of attention. Similar restrictions on topics are assumed by Erteschik-Shir 1997, who analyzes the left dislocated phrase in constructions like (9)-(13) as a focus rather than a topic, as it is more likely to be something the speaker wants to call the addressee's attention to than something which is already in the focus of attention. Both Tomlin and Erteschik-Shir base their arguments on conceptions of 'topic' that essentially equate this notion with focus of attention and do not follow from the generally accepted relational definition of topic as what the sentence is about [6] Their notion of topic is thus somewhat more narrow than that assumed by most researchers. It is closer to 'continued topic' or the backward center of Centering Theory. The fact that *wa*-marked and dislocated phrases often do not refer to recently mentioned or otherwise salient entities thus cannot be taken as empirical evidence against the claim that such phrases mark topics.

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[5] As Gundel, Hedberg and Zacharski point out, it is irrelevant how the status is acquired, i.e. whether through previous mention in the discourse, general world knowledge, presence in the extralinguistic context, etc. The referents of generics would thus always be familiar, or at least uniquely identifiable, since the addressee could be assumed to have a representation of the class/kind. The fact that the indefinite article typically doesn't encode familiar entities is attributed to a Quantity implicature; it is not encoded as part of the meaning of 'indefinite' determiners, as in Heim (1982) inter alia.

More serious empirical challenges to the assumption that so-called topicalized and dislocated phrases refer to topics come from Ellen Prince and other researchers who base their analyses on corpus studies of these constructions. Citing examples from naturally occurring discourse, Prince (1997) argues that the constructions in question do not have a topic marking function. Rather, they have a variety of different functions including contrast and avoidance of discourse-new subjects.

Prince's proposals about the discourse functions of left dislocated and topicalized sentences provide important insights into the reasons why people might use these constructions in particular discourse contexts. Her ideas also make it possible to capture the fact that the same syntactic construction may have different functions in different languages. But I don't think the specific functions she proposes are necessarily inconsistent with the claim that these topicalization and dislocation partitions a sentence into two syntactic constituents, one of which is interpreted as topic and the other as comment. On the contrary, this assumption may help provide an explanation for some of the specific discourse functions she posits.

Examples like (15) and (16) (both from Prince 1997) do, however, appear to pose a challenge to the claim that dislocated phrases refer to topics, as the dislocated phrases *most middle class Americans* and *any company* are not even referential

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[6] Tomlin's aim, in fact, is to argue that topic and focus are unnecessary linguistic constructs which can be reduced to the psychological notion of attention. For Erteschik-Shir, on the other hand, topic is a linguistic notion, defined in relational terms as what the sentence is about (the complement to 'predication'); however, she also assigns to topics the pragmatic value of instructing the addressee to 'select a card from the top of the file', thus essentially building in the referential givenness condition that topics must refer to recently mentioned or otherwise salient entities.

(15) Most middle-class Americans, when they look at the costs plus the benefits, they're going to be much better off.

(16) Any company, if they're worth 150 million dollars, you don't need to think of ....

If topic is what the sentence or proposition is about, a definition assumed by virtually all researchers, then referentiality would have to be a minimal semantic restriction on topics. There would have to be an individuated entity in order for truth value to be assessed in relation to that entity. Notice, however, that the dislocated phrases in (15) and (16) are both strong NPs in the sense of Milsark 1977, and both are pronounced with stress on the quantifier. As is well known, such phrases, which often have a partitive reading (which includes an overt or covert definite phrase), typically have the same presupposition effect as definite NPs. In Gundel 1974/89, I proposed that the topic in dislocated phrases of this type is the entity which is quantified (i.e. the N-set), not the whole quantified phrase. Thus, (15) and (16) could be paraphrased as (15') and (16') respectively.

(15') (As for) Middle-class Americans, when most of them look at the costs plus the benefits, they're going to be much better off.

(16') (As for) Companies, if any one of them is worth 150 million dollars, you don't need to think of ....

Under such an analysis, the quantifier in (15) and (16) is part of the syntactic topic phrase, but it is not part of the semantic or pragmatic topic. If the topic of (15) is the generic 'middle class Americans' and the topic of (16) is the generic 'companies', the topic of these sentences is not only referential, in the sense that it maps onto some individuated entity; it is also familiar in the sense defined above.

Prince also cites examples like (17), however, where the dislocated phrase is a specific indefinite, which is referential, but its referent cannot be assumed to be already familiar to the addressee.

(17) An old preacher down there, they augured under the grave where his wife was buried.

If we assume that the dislocated phrase refers to the topic, then sentences like (17) are clear counterexamples to the familiarity condition on topics proposed in Gundel (1985) and elsewhere. If (17) is about anything, then it must be about the individual referred to as *an old preacher down there*. But the referent of this phrase is not assumed to be familiar to the addressee. If the speaker could assume the addressee already has a representation of the preacher in memory, he would have used a definite phrase instead. Reinhart 1982, Davison 1984 and others have in fact proposed that referential (specific) indefinites can be topics, and that familiarity is therefore not a necessary condition on topics. Reinhart 1995 uses this assumption to explain why a sentence like (18a) is judged as false by some speakers and as neither true nor false by others, while (18b) is easily judged as simply false by all speakers.

(18) a. Two American kings lived in New York.
b. There were two American kings who lived in New York.

Reinhart's argument, based on Strawson's insight that only topics carry existential presuppositions (because they are the locus of truth value assessment), is that *two American kings* in (18a) may or may not be interpreted as topic, depending on the context of utterance. The same phrase in (18b) can never be a topic, however, since topics are excluded from post-copular position in existential sentences.

As noted above, quantified indefinites have a partitive interpretation, available when the quantifier is stressed, where the topic is not the whole indefinite phrase, but only the N-set (*American kings* in this case) which is quantified. It is only under this interpretation, I would argue, that the subject phrase in (18a) could be interpreted as referring to the topic. And this is also the interpretation which yields the truth value gap interpretation. Examples like those in (18) can thus be accounted for in a manner similar to that proposed by Reinhart, without assuming that specific indefinites can serve as topics, and thereby giving up the familiarity condition. No such analysis is available for (17), however; such sentences thus remain a serious counterexample to the claim that topics must be familiar.

Weakening the condition to referentiality allows specific indefinite topics like the dislocated phrase in (17), but it also allows other referential indefinites to be topics, and thus fails to account for the definiteness effect of topics illustrated in examples like (8) and (13). Moreover, it fails to capture the insights that originally motivated Strawson's position that only topical definites carry an existential presupposition. I don't believe that extending the presupposition condition to indefinites is in the spirit of Strawson's ideas here. While the notion of existential presupposition can be construed as purely semantic, i.e. independent of speakers, hearers and other aspects of the context of utterance, Strawson in fact characterized it specifically in terms of identifiability by the hearer, i.e. as a pragmatic notion similar to familiarity. And this status is clearly not associated with specific indefinites like the dislocated phrase in (17).

5 Towards a Resolution. The Grammar-Pragmatics Interface

In the remainder of this section, I will sketch an account of the topic-comment distinction which attempts to reconcile the two different positions concerning referential properties of topics within a relevance theoretic view of language understanding (Sperber and Wilson 1986/95). The basic premise of Relevance Theory (RT) is that human cognitive processes, including language understanding, are geared towards achieving adequate contextual effects for a minimum amount of processing effort. When interpreting an utterance, the addressee must identify the assumption explicitly expressed, and must work out the consequences of adding this assumption to a set of existing assumptions in memory, by strengthening or eliminating the existing assumptions or by yielding new assumptions. Thus, the interpretation crucially involves seeing what Sperber and Wilson call the 'contextual effects' of this assumption in a context determined, at least in part, by earlier acts of comprehension. According to RT, then, interpretation simultaneously involves both grammar-driven and purely inferential, processes, the latter including not only Gricean-type implicatures, but also reference assignment, spatio-temporal assignment, and other Relevance-driven enrichments which are underdetermined by the grammar, but are needed to determine the full meaning of the expressed proposition.

Assuming such an account of utterance understanding, I propose the following.

1. The (decoded) semantic/conceptual representation associated with a sentence, and the expressed proposition which is an 'enrichment' of that representation, is a topic-comment structure, where the topic is what the sentence is about and the comment is the main predication about the topic. A semantic/conceptual representation will be well-formed provided that the topic is referential, and thus capable of combining with a predicate to form a full proposition. This much is determined by the grammar. It follows from what speakers know about the way sentence forms are paired with possible meanings in their language.

2. Topic-comment structure as determined by the grammar is exploited at the grammar-pragmatics interface, where information expressed in the proposition is assessed in order to derive 'contextual effects', assessment being carried out relative to the topic. Utterances with non-familiar topics typically fail to yield adequate contextual effects, since assessment can only be carried out if the processor already has a mental representation of the topic. Such utterances are thus pragmatically deviant, even if they are grammatically well-formed.

The referentiality condition on topics, then, is a semantic, grammar-based, condition.. The stronger familiarity condition on topics is a pragmatic, Relevance-based distinction - one which holds at the grammar-pragmatics (conceptual-intentional) interface. In Gundel (1985) I suggested, in the absence of an explicit pragmatic theory of language understanding, that the familiarity condition on topics can be suspended 'under certain conditions', thus allowing for examples like (17). Relevance theory allows us to articulate more explicitly what those conditions are. Sentences like (17) are not pragmatically deviant since contextual effects can be derived without assessing the truth of the proposition in relation to the topic (alternatively, assessment could be carried out only nominally with respect to the familiar phrase 'down there' that the topic is anchored in.) In such cases, the proposition is simply accepted as 'new information' without actually checking whether it contradicts, strengthens or otherwise adds to existing assumptions. Such an account is supported by the fact that when assessment is essential, as in questions and directives, dislocation of indefinites becomes infelicitous at best, as seen in (19) and (20).

(19) a. The old preacher down there, did they auger under the grave where his father was buried?
b. ??An old preacher down there, did they auger under the grave where his father was buried?

(20) a. The old preacher down there, auger under the grave where his father was buried.
b. ??An old preacher down there, auger under the grave where his father was buried.

I conclude then that while the topic-comment (presupposition-focus) relation is clearly linguistic in nature, the familiarity condition and corresponding 'definiteness/presupposition effects' of topics follow from general pragmatic principles. They are not part of the grammar.

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Two Ways of Deriving Distributive Readings

J.-R. Hayashishita

1 Introduction

Consider the example in (1).

(1) (I bet), (at least) *more than two students* will visit *three professors.*

The most natural reading found in (1) is that there are more than two students, and each of the students will visit three professors. However, if we imagine three professors we know, and utter the statement in (1), another reading can be felt quite easily; cf. Chomsky 1957:100-101. The reading is that each of the three professors will be visited by more than two students. I will call both of these readings distributive readings (henceforth DR). In particular, the former will be referred to as the DR for *more than two students* over *three professors* (DR <more than two students, three professors>), and the latter as the DR for *three professors* over *more than two students* (DR <three professors, more than two students>). Despite the fact that DR <non-subject NP, subject NP> does require the speaker's imagination of a specific group while DR <subject NP, non-subject NP> does not, they are generally treated as having an equal status (e.g., Montague 1974, May 1977). Accordingly, it is understood that the scope order of a given sentence cannot be determined with reference to the c-command relation at the point of Spell-Out alone.

In this paper, I argue that there are two ways to interpret sentences. A given sentence can always be interpreted by "directly" mapping the LF representation onto a semantic representation (henceforth SR). But when a sentence is represented at LF in a particular way, it can optionally be interpreted through some extra mechanism, what I call Omega Predication (a special kind of Subject Predication), which makes reference to the speaker's imagination of a specific group. In particular, I claim that DR <NP_1, NP_2> is derived through the "direct" mapping only if NP_1 c-commands NP_2 in their A-positions; i.e., the c-command relation at the point of Spell-Out determines the scope order of a sentence (hence, the scope principle in Reinhart 1976). I will argue in support of this claim by investigating the availability of DR's in the environments where a sentence cannot be interpreted by means of Omega Predication.

2 The Availability of DR's with NP Types

It has been commonly assumed that a simplex clause, [NP VERB ... NP ...], always yields DR <subject NP, non-subject NP> as well as DR <non-subject NP, subject NP>. Liu (1990) points out however that this is not always the case. She claims that DR <non-subject NP, subject NP> is possible when the non-subject NP is of Type A in (2), but not when it is of Type B; see also Beghelli & Stowell 1995.[1,2]

(2) Type A: John and Bill, every boy, all girls, four girls, some boy,
Type B: more than four girls, more than 40%, a good number of people

(3) and (4) illustrate her point.

(3) (I bet, *at least*) *two girls* approached *every boy* (at yesterday's party).
YES DR <non-subject NP, subject NP>

(4) (I bet, *at least*) *two girls* approached *more than five boys* (at yesterday's party).
NO DR<non-subject NP, subject NP>

The non-subject NP in (3) is of Type A while that in (4) is of Type B. DR <non-subject NP, subject NP> is available in the former, but not in the latter. In contrast, DR <subject NP, non-subject NP> is available irrespective of the NP type, as illustrated in (5) and (6).

(5) (At the election) *five students* voted for *some professor*.
YES DR <subject NP, non-subject NP>

(6) (At the election,) *more than five students* voted for *some professor*.
YES DR <subject NP, non-subject NP>

The subject NP in (5) is of Type A, while that in (6) is of Type B. In both cases, DR <subject NP, non-subject NP> is available.

In Japanese, the standard assumption has been that a simplex clause, [NP-NOM ... NP-CM ... VERB] (where NOM stands for nominative, and CM stands for either accusative or dative), yields DR <subject NP, non-subject NP>, but not DR <non-subject NP, subject NP> (Kuroda 1969/70, Hoji

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[1] Liu (1990) classifies NP's into four categories, based upon the semantic properties such as Strong/Weak and Downward Entailment, and the one of the categories corresponds to Type B in (2). I do not adopt her four-way classifications in part because they are not directly relevant to the claim in this paper.

[2] The distinction between Type A and Type B is made on the basis of the surface judgements. It will be shown in Section 5.1 that it is not a grammatical distinction.

1985). I claim that with the aid of the speaker's imagination of a specific group when the non-subject NP is of Type A in (7), DR <non-subject NP, subject NP> becomes possible; cf. Kitagawa 1990.[3] Thus, the generalization of Japanese resembles that of English – i.e., the NP's of Type A in (7) as a non-subject NP can distribute over a subject NP, but the NP's of Type B cannot.

(7) Type A
Toyota to Nissan 'Toyota and Nissan',
subete-no kaisya 'all companies', daremo 'every man',
sannin-no otoko 'three men', dareka 'someone'.
Type B
sanninizyoo-no otoko 'three or more men',
40%izyoo no gakusee 'more than 40% of the students',
kanarinokazu-no gakusee 'a good number of students'.

(8) and (9) illustrate the generalization.

(8) (watasi-ga kakuninsitatokorodewa), (*sukunakutomo*) *ippon-no ya-ga itutu-no mato-ni* sasatteita. YES DR <non-subject NP, subject NP>
'(as far as I have checked), (*at least*) *one arrow* pierced *five targets.*'

(9) #(watasi-ga kakuninsitatokorodewa), (*sukunakutomo*) *ippon-no ya-ga itutuizyoo-no mato-ni* sasatteita.
'(as far as I have checked), (*at least*) *one arrow* pierced *five or more targets.*' NO DR <non-subject NP, subject NP>

Similar to the case in English, DR <subject NP, non-subject NP> is always possible, irrespective of the NP type, as illustrated in (10) and (11).

(10) *sannin-no otoko-ga hitori-no onna-o* paatii-ni sasotta.
'*three men* invited *one woman* to the party.'
YES DR <subject NP, non-subject NP>

(11) *sanninizyoo-no otoko-ga hitori-no onna-o* paatii-ni sasotta.
'*three or more men* invited *one woman* to the party.'
YES DR <subject NP, non-subject NP>

---

[3] Kuroda (1970) makes the generalization based upon the examples of [NP-NOM NP-CM ... VERB], where the NP-CM is of Type A. Hoji (1985), on the other hand, makes the generalization with the NP-CM that would be derived through a process of attachment transformation, or conjunction reduction in the sense of Kuroda's 1965 dissertation, e.g., NP-*sae* 'NP-even', and NP-ka NP-ka 'NP or NP or.' In this paper, the NP's used in Hoji 1985 are omitted due to space limitation.

The subject NP in (10) is of Type A, while that in (11) is of Type B. In both cases, DR <subject NP, non-subject NP> is available.

The preceding discussion is summarized in (12).

(12) Generalization

In a simplex clause, DR <subject NP, non-subject NP> is always available, while DR <non-subject NP, subject NP> requires that the non-subject NP be of Type A.

3 The Availability of DR's with a Syntactic Environment

The generalization in (12) must be refined. In order for DR <non-subject NP, subject NP> to be available in a simplex clause, the particular syntactic environment in (13) is necessary.

(13) A necessary syntactic environment for DR <non-subj. NP, subj. NP>.

There is an ω-position, an A-position outside of the theta domain of a verb, postulated in Ueyama 1997 & 1998, and it c-commands both the subject NP and the non-subject NP and is not filled at LF.

To provide support for the claim in (13), I need to first establish the existence of an ω-position. For this reason, I will make small excursuses.

3.1 Excursus 1: An A-position outside of the theta domain of a verb (ω-position) (Ueyama 1997 & 1998)

First, consider the following contrast in (14).

(14) a. Every student hit his best friend.
b. *His best friend hit every student.
c. ?*Who$_1$ did [his best friend] hit t_1?

The examples in (14b) and (14c) exhibit weak crossover effects (Postal 1971 and Wasow 1972, among others), and it is understood that such effects are induced only when A'-movement takes place. The examples in (15a, b) do not induce weak crossover effects since the movement involved is A-movement, rather than A'-movement.

(15) a. Every daughter$_1$ seems [to her father] t_1 to be beautiful.
b. Who$_1$ t_1 seems [to his mother] t_1 to have come?

In order to account for the contrast between (14b) and (14c), and (14a), (15a) and (15b), let us assume (16).

(16) The Constraint on Weak Crossover Effects
A dependent term can be anaphorically related to an NP by means of bound variable anaphora if and only if it is c-commanded by (a trace of) an NP in an A-position.

Now turning to Japanese examples, it is reported in Hoji 1985 and Yoshimura 1992, among others, that weak crossover effects in (17b) can be remedied if the relevant NP is fronted. Thus, (17c), the "scrambled" counterpart of (17b), does not exhibit weak crossover effects.

(17) a. [$_{S}$ NP-NOM [$_{NP}$... dependent term ...]-CM VERB]
b. *[$_{S}$ [$_{NP}$... dependent term ...]-NOM NP-CM VERB]
c. [$_{S}$ NP-CM [$_{NP}$... dependent term ...]-NOM VERB]

Given (16), the status of (17c) indicates that the fronted NP is in an A-position. Hence there is an A-position outside of the theta domain of a verb, which Ueyama (1997) refers to as an ω-position; cf. Saito 1992 and in particular Ueyama 1998:Ch.2.

3.2 Excursus 2: Two types of clauses (Ueyama 1997 & 1998)

Ueyama's investigation of this issue is more fine-grained. She points out that in some types of clauses, weak crossover effects cannot be remedied even if the relevant NP is fronted. Let us call such clauses U(eyama)-Type clauses. One example of a U-Type clause is an embedded clause of a certain perceptual report construction. The generalization regarding weak crossover effects in the embedded clause is thus modified as in (18).

(18) a. [$_{S\text{-}U}$ NP-NOM [$_{NP}$... dependent term ...]-CM VERB]
b. *[$_{S\text{-}U}$ [$_{NP}$... dependent term ...]-NOM NP-CM VERB]
c. *[$_{S\text{-}U}$ NP-CM [$_{NP}$... dependent term ...]-NOM VERB]
(where S-U signifies a U-Type clause)

Given (16), the status in (18c) indicates that the fronted NP is not in an A-position. Hence, it is reasonable to conclude that U-Type clauses do not contain an ω-position.

She furthermore points out that only one fronted NP can have an A-property. In (19a), there are two instances of the violation of (16). (19b), the "scrambled" counterpart of (19a), is not acceptable. In (19c) and (19e), on the other hand, there is only one instance of the violation of (16). The "scrambled" counterpart of (19c) and (19e); i.e., (19d) and (19f) respectively, are acceptable.

(19) a. *[$_S$ [... dependent$_i$ … dependent$_j$ …]-NOM NP$_i$-CM NP$_j$-CM VERB]
b. *[$_S$ NP$_i$-CM NP$_j$-CM [… dependent$_i$ … dependent$_j$ …]-NOM VERB]
c. *[$_S$ [… dependent$_i$ … *John* …]-NOM NP$_i$-CM NP$_j$-CM VERB]
d. [$_S$ NP$_i$-CM NP$_j$-CM [… dependent$_i$ … *John* …]-NOM VERB]
e. *[$_S$ [… *John* … dependent$_j$ …]-NOM NP$_i$-CM NP$_j$-CM VERB]
f. [$_S$ NP$_i$-CM NP$_j$-CM [… *John* … dependent$_j$ …]-NOM VERB]

Given the Constraint in (16), the status of (19b), in contrast to that of (19d) and (19f), indicates that either NP$_i$-CM or NP$_j$-CM can be in an ω-position, but they cannot be in an ω-position simultaneously. Hence it is reasonable to conclude that a clause has maximally one ω-position.

Hence, Ueyama concludes that there are two types of clauses as in (20).

(20) a. [$_\delta$]
b. [$_\omega$][$_\delta$]

3.3 The availability of DR's with an ω-position

Let us now turn to the claim in (13). In support of (13), I will show that DR <non-subject NP, subject NP> is not available in the environments depicted in (21). (21a) is a case where a clause does not contain an ω-position, and (21b) is a case where a clause contains an ω-position, but it is filled with some other element.

(21) DR <NP$_2$, NP$_1$> is not available in the following environments.
a. … [$_{S\text{-}U}$ *NP$_1$-NOM NP$_2$-CM* VERB]…,
b. [[$_\omega$ NP-CM] [[… dependent …]*NP$_1$*]-*NOM NP$_2$-CM* VERB].

As an illustration of (21a), consider (8) again. Presumably, because of the physics of our present world, the only reading available for (8) is DR <non-subject NP, subject NP>. Suppose (21a) is correct. Then, if we place (8) in the embedded clause of a certain perceptual report construction (U-Type clause), the entire statement should sound odd. The prediction is indeed borne out, as illustrated in (22).

(22) #John to Bill sorezore-ni $[_{\text{S-U}}$ *ippon-no ya-ga itutu-no mato-ni* sasatteiru] no-ga mieta.
'John and Bill each saw $[_{\text{S-U}}$ *one arrow* piercing *five targets*].'

It is not the case that DR <non-subject NP, subject NP> is never allowed in non-matrix clauses. (23) sounds perfect, suggesting that the DR <non-subject NP, subject NP> is available in the embedded clause in (23). Hence the generalization in (21a) has received support.

(23) John to Bill sorezore-ga $[_{\text{S}}$ *ippon-no ya-ga itutu-no mato-ni* sasatteita]-to hookokusita (rasii)
'(it seems that) John and Bill each reported that $[_{\text{S}}$ *one arrow* was piercing *five targets*].'

It should be noted that DR <subject NP, non-subject NP> is available even in a U-Type clause. Consider (24).

(24) John to Bill sorezore-ni $[_{\text{S-U}}$ *hutari-no sensee-ga gonin-no gakusee-o* donarituketeiru] no-ga mieta.
'John and Bill each saw $[_{\text{S-U}}$ *two teachers* scolding *five students*].'

The statement in (24) is true in the world where John and Bill each saw that there are two teachers, and each of the teachers was scolding five students, and the number of students involved was twenty.

Turning to the generalization in (21b), let us consider (25).

(25) hutatuizyoo-no gakkoo-o [soko-o ooensiteiru *dareka*]-*ga* (paatii-ni sankasita) *subete-no kigyoo-ni* urikondeita.
'(Lit.) two or more schools, *someone* who has been supporting it was recommending to *all the companies* (which participated in the party).'

In (25), the fronted NP, *hutatuizyoo-no gakkoo* 'two or more schools', must be in an ω-position; otherwise, weak crossover effects would be induced. In this situation, a non-subject NP *subete-no kigyoo* 'all companies' cannot distribute over *dareka* 'someone'; i.e., (25) allows none of the readings in (26).

(26) a. $^{\text{NO}}\underline{\exists Y(Y \subseteq \textit{company} \wedge |Y| = |\textit{company}|)\ \forall y(y \in Y)}$ $\underline{[\exists X(X \subset \textit{person} \wedge |X| \neq 0)\ \forall x(x \in X)}$ $[\exists Z(Z \subseteq \textit{school} \wedge n \geq |Z| \geq 2)$ $\forall z(z \in Z)$ [x who supports z was recommending to y z]]], where n is an integer close to 2.

b. $^{\text{NO}}\underline{\exists Y(Y \subset \mathit{company} \wedge |Y| = |\mathit{company}|)\ \forall y(y \in Y)}\ [\exists Z(Z \subseteq \mathit{school} \wedge n \geq |Z| \geq 2)\ \forall z(z \in Z)\ \underline{[\exists X(X \subset \mathit{person} \wedge |X| \neq 0)\ \forall x(x \in X)}\ [\text{x who supports z was recommending to y z}]]]$, where n is an integer close to 2.
c. $^{\text{NO}}\exists Z(Z \subseteq \mathit{school} \wedge n \geq |Z| \geq 2)\ \forall z(z \in Z)\ \underline{[\exists Y(Y \subset \mathit{company} \wedge |Y| = |\mathit{company}|)\ \forall y(y \in Y)\ [\exists X(X \subset \mathit{person} \wedge |X| \neq 0)\ \forall x(x \in X)}\ [\text{x who supports z was recommending to y z}]]]$, where n is an integer close to 2.

If the fronted NP is not related to a dependent term, and hence need not be in an ω-position, a non-subject, *subete-no kigyoo,* can distribute over the subject NP, *dareka*. (28) is one of the readings for (27).

(27) hutatuizyoo-no gakkoo-o *dareka-ga* (paatii-ni sankasita)
subete-no kigyoo-ni urikondeita.
'(Lit.) two or more schools, *someone* was recommending to *all the companies* (which participated in the party).'
(28) $^{\text{YES}}\underline{\exists Y(Y \subset \mathit{company} \wedge |Y| = |\mathit{company}|)\ \forall y(y \in Y)[\exists X(X \subseteq \mathit{person} \wedge |X| \neq 0)\ \forall x(x \in X)}\ [\exists Z(Z \subseteq \mathit{school} \wedge n \geq |Z| \geq 2)\ \forall z(z \in Z)\ [\text{x was recommending to y z}]]]$, where n is an integer close to 2.

It should be noted that DR <subject NP, non-subject NP> is available even within the clause where an ω-position is filled. In (29), the fronted NP must be in an ω-position. However (30) is still one of the readings for (29).

(29) hutatuizyoo-no gakkoo-o [soko-o ooensiteiru *subete-no hito*]*-ga*
(paatii-ni sankasita) *dokoka-no kigyoo-ni* urikondeita.
'(Lit.) two or more schools, *everyone* who has been supporting it was recommending to *some company* (which participated in the party).'
(30) $^{\text{YES}}\exists Z(Z \subseteq \mathit{school} \wedge n \geq |Z| \geq 2)\ \forall z(z \in Z)\ \underline{[\exists X(X \subset \mathit{person} \wedge |X| = |\mathit{person}|)\ \forall x(x \in X)\ [\exists Y(Y \subset \mathit{company} \wedge |Y| \neq 0)\ \forall y(y \in Y)}\ [\text{x who supports z was recommending to y z}]]]$, where n is an integer close to 2.

The discussion in Section 3 is summarized as (31). The discussion in Section 2 and 3 as a whole is summarized as (32).

(31) Generalization
DR <non-subject NP, subject NP> in a simplex clause is available only if an ω-position, which c-commands both NP's, is not filled at LF, while

DR <subject NP, non-subject NP> is available irrespective of the clause type.

(32) Generalization
DR <NP_1, NP_2> is available only if (i) NP_1 c-commands NP_2 at the point of Spell-Out or (ii) NP_1 is an NP of Type A and there is an ω-position not filled at LF, that c-commands both NP_1 and NP_2.

4 Hypotheses

4.1 Assumptions

First, I assume that all of the NP's of Type A and Type B can be interpreted as either (33a) or (33b) at LF.

(33) a. Generalized Quantifier (henceforth $NP^{I(ndividual)}$)
(Barwise & Cooper 1981).
b. Group Existential (henceforth $NP^{E(xistential)}$)

For example, *three men* in *three men came* can be interpreted either as (34a) or as (34b).

(34) a. NP^I: $\exists X(X \subseteq \mathit{men} \wedge |X| = 3)\ \forall x\ (x \in X)\ [V(x)]$
b. NP^E: $\exists X(X \subseteq \mathit{men} \wedge |X| = 3)\ [V(X)]$

I leave open the issue of whether NP^I can be differentiated from NP^E by the introduction of event variables. However, I assume that an NP must be interpreted as NP^I in some environments. One environment is when an NP is related to a singular-denoting dependent term by means of bound variable anaphora. Another environment is when it distributes over another NP.

4.2 The Null Hypothesis

Having made the assumptions regarding the interpretive possibilities of NP's, we are in a position to put forth a hypothesis to account for the Generalization in (32). First, I would like to address the following question.

(35) Why is DR <NP_1, NP_2> always possible if NP_1 c-commands NP_2 at the point of Spell-Out, irrespective of the NP type and the clause type?

To answer the question, I assume that a given sentence can always be interpreted solely on the basis of its LF representation. I claim (36).

(36) The Null Hypothesis
The relative scope of two NP's can be determined from the top node down.

Under (36), the LF representation of a given sentence is mapped onto the SR in such a way that a c-commanding NP scopes over a c-commanded NP. When the c-commanding NP is interpreted as NP^I, it consequentially distributes over the c-commanded NP. Since all the NP's of Type A and Type B can be interpreted as NP^I, they can distribute over the c-commanded NP's.

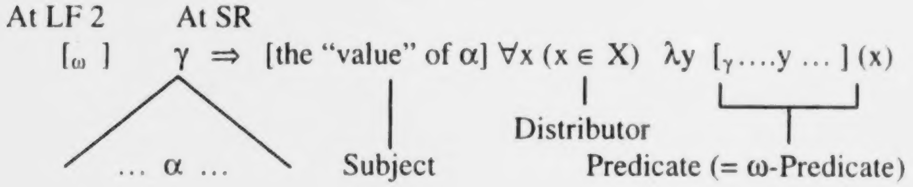
4.3 The Omega Predication Hypothesis

The next question I would like to address is the following.

(37) How is DR <NP_1, NP_2> derived, where NP_1 does not c-command NP_2?

To answer the question, I claim that a given sentence need not be interpreted solely on the basis of its LF representation. In particular, I claim that a sentence can be interpreted by means of Omega Predication in (38).

(38) The Omega Predication Hypothesis
If a given sentence has the following LF representation, then in SR the "value" of α can be interpreted as a Subject of a Predicate, γ, (hereafter called ω-Predicate), utilizing an ω-position.


At LF 2
At SR
$[_\omega\ ]$ γ $\Rightarrow$ [the "value" of α] $\forall x\,(x \in X)$ λy $[_\gamma \ldots y \ldots]\,(x)$
… α …
Subject
Distributor
Predicate (= ω-Predicate)

(39) Three necessary conditions for Omega Predication
a. An ω-position is unfilled at LF.
b. α is interpreted as NP^E at LF.
c. The "value" of α is one of the sets stored in the domain of the speaker's direct experience in the sense of Takubo & Kinsui 1997.

(40) The ω-Predicate Formation Hypothesis
At SR all the NP's in an ω-Predicate are incorporated into a verb to form a Predicate of a Subject in the ω-position.

(41) A necessary condition for ω-Predicate Formation
NP's are interpreted as NP^E at LF.

Now let us see how DR <NP_1, NP_2>, where NP_1 does not c-command NP_2, is derived. Consider DR <every boy, two girls> for (3).

(42) The derivation of DR <non-subject NP, subject NP>
a. PF: *two girls* approached *every boy* (at yesterday's party). (= (3))
b. LF: $[[_{\omega}\ ][_{NP}\text{ two girls}]^E \text{ approached } [_{NP}\text{ every boy}]^E\ ]$
c. SR: $\exists X(X = \Sigma \wedge X \subseteq \mathit{boy} \wedge |\mathit{boy}| = |X|)\ \forall x(x \in X)\ \lambda y[$ *two girls approached* $y](x)$, where Σ is one of the sets stored in the domain in the speaker's direct experience.
d. TC: (42a) is true iff there is a set X, X is one of the sets stored in the domain in the speaker's direct experience, and is a set consisting of all boys such that all x, x is a member of X such that x has the property that two girls approached x.

First, *every boy*, whose value is to be the Subject of an ω-Predicate, and *two girls*, which is to be incorporated into a verb, must be represented as NP^E at LF; thus, (42b). Then, *two girls* is incorporated into a verb, and the SR in (42c) is derived. Hence, DR <non-subject NP, subject NP> is derived.

5 On Omega Predication

5.1 On NP types

We have seen in Section 2 that DR <non-subject NP, subject NP> obtains only if the non-subject NP is of Type A; i.e., the Generalization in (12). Given the Omega Predication Hypothesis, we can now paraphrase the generalization. The "value" of an NP of Type B cannot be a Subject of an ω-Predicate. Although the distinction between Type A and Type B has been crucially made in the preceding discussion, it cannot be considered to be a grammatical distinction for the following reason.

By hypothesis, a Subject of an ω-Predicate is one of the sets stored in the domain of the speaker's direct experience. The intuition behind this hypothesis is as follows. When the sentence, *more than two students will visit three professors*, is interpreted by means of Omega Predication, some set consisting of three professors such as {john, bill, ken} is selected from the domain, and each member of the set is predicated by the ω-Predicate, λy [*two students will visit* y]. In other words, *three professors* functions to "check" which set in the domain is appropriate to be the Subject. In order for a given NP to serve this "checking function", it must be able to denote specific groups since by definition the sets in the domain of the speaker's direct experience are specific groups. The NP's of Type B do not denote a specific group in a normal context. Suppose that our phonology class consists of ten students, {lyn, sue, ken, …}, and all of the ten students attended the class. In this situation, we may say, "All students came / subete-no gakusee-ga kita," or "Ten students came / zyuunin-no gakusee-ga kita." But it is odd to say, "More than eight students came / hatininizyoo-no gakusee-ga kita." Therefore, the NP's of Type B usually do not serve the "checking function" under discussion. Hence, the Generalization in (12) obtains.

However under some appropriate context, it is not impossible for an NP of Type B to denote a specific group. For example,[4] John and Ken are wondering whether they should rob some shops on 5th Avenue in New York. They agreed that they would not execute the plan if more than five buildings on 5th Avenue were guarded. Ken went to spy, and saw seven buildings guarded. He returned, saying, "Well, a guard was standing in front of more than five buildings." In this situation, *more than five buildings* can denote a specific group of seven buildings; thus, its value can be a Subject of an ω-Predicate. As expected, in this situation it can distribute over the subject NP.[5] Even in the examples like (4) and (9) in Section 2, it would not be surprising that DR <non-subject NP, subject NP> would be found if the speaker could conceive some appropriate context so that the non-subject NP could felicitously denote a specific group.

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[4] This context is due to Maria Gallardo (p.c. May 1999).

[5] Ueyama (1998) points out in Appendix D.2.1 that NP's that are able to denote a specific group can be related to a singular-denoting dependent term without invoking weak crossover effects, as illustrated in (i) (cf. (ii)). Ueyama (1997) demonstrates that the acceptability of the examples like (i) becomes degraded when an ω-position is not available.

(i) ?soko-no bengosi-ga subete-no zidoosya gaisya-o uttaeteiru (node, zidoosya gyookai-wa daikonran-ni otiitteiru). (= Ueyama's 1998 (80b))

'(Lit.) (since) its attorney has sued every automobile company, (the automobile industry has been thrown into a state of disorder).'

(ii) ?*soko-no bengosi-ga mittuizyoo-no zidoosya gaisya-o uttaeteiru (node, zidoosya gyookai-wa daikonran-ni otiitteiru).

'(Lit.) (since) its attorney has sued three or more automobile companies, (the automobile industry has been thrown into a state of disorder).'

5.2 On the ω-Predicate Formation Hypothesis

The ω-Predicate Formation Hypothesis in (40) is motivated by the limited interpretive possibilities within an ω-Predicate. In particular, there are phenomena which I refer to as Freezing Effects.

(43) Freezing Effects
The NP's in an ω-Predicate cannot be interpreted as an NP^I.

Given the assumption in 4.1, (44) and (45) follow.

(44) Freezing Effects on Scope
The NP's in an ω-Predicate cannot distribute over another NP.
(45) Freezing Effects on Binding
The NP's in an ω-Predicate cannot be related to a dependent term by means of bound variable anaphora.

As a demonstration of (44), let us consider (46).

(46) (kinoo-no paatii-de)(*sukunakutomo*) *sanninizyoo-no heddohantaa-ga hutari-no hito-ni yottu-no kaisya-o* syookaisiteita (n datte).
'(at yesterday's party) (*at least*) *three or more headhunters* were introducing to *two people four companies*.'

Given the claim in Section 4.3, if a non-subject, *hutari-no hito* 'two people' were to distribute over the subject NP *sanninizyoo-no heddohantaa* 'three or more headhunters', the sentence must be interpreted by means of Omega Predication. Then, *sanninizyoo-no heddohantaa* and the other non-subject NP, *yottu-no kaisya* 'four companies', would be in the ω-Predicate. In this situation, the DR's between *sannin-no heddohantaa* and *yottu-no kaisya* do not obtain; i.e., neither (47a) nor (47b) can be a reading for (46). (48) is the only reading available.

(47) a. $^{NO}\exists Y(Y \subseteq \mathit{person} \wedge |Y| = 2)\forall y(y \in Y)\ \underline{[\exists X(X \subset \mathit{headhunter} \wedge n \geq |X| \geq 3)\ \forall x(x \in X)\ [\exists Z(Z \subset \mathit{company} \wedge |Z| = 4)\forall z(z \in Z)}$ [x was introducing to y z]]], where n is an integer close to 3.

b. $^{NO}\exists Y(Y \subseteq \mathit{person} \wedge |Y| = 2)\forall y(y \in Y)$ $\underline{[\exists Z(Z \subseteq \mathit{company} \wedge |Z| = 4)\forall z(z \in Z)\ [\exists X(X \subseteq \mathit{headhunter} \wedge n \geq |X| \geq 3)\forall x(x \in X)}$ [x was introducing to y z]]], where n is an integer close to 3.

(48) $^{YES}\exists Y(Y \subseteq \mathit{person} \wedge |Y| = 2)\ \forall y(y \in Y)\ [\exists X(X \subseteq \mathit{headhunter} \wedge n \geq |X| \geq 3)\ \exists Z(Z \subseteq \mathit{company} \wedge |Z| = 4)\ [\forall x(x \in X)\ \exists z(z \in Z)$ [x was introducing to y z] $\wedge\ \forall z(z \in Z)\ \exists x(x \in X)$ [x was introducing to y z]]], where n is an integer close to 3.[6]

It should be noted that when the sentence is not interpreted by means of Omega Predication, the subject NP, *sanninizyoo-no heddohantaa* 'three or more headhunters' can distribute over a non-subject NP, *yottu-no kaisya* 'four companies'. (49) is one of the readings for (46). Hence, (44) has received support.

(49) $^{YES}\underline{\exists X(X \subseteq \mathit{headhunter} \wedge n \geq |X| \geq 3)\ \forall x(x \in X)}\ [\exists Y(Y \subseteq \mathit{person} \wedge |Y| = 2)\forall y(y \in Y)\ \underline{[\exists Z(Z \subseteq \mathit{company} \wedge |Z| = 4)\forall z(z \in Z)}$ [x was introducing to y z]]], where n is an integer close to 3.

Turning to the claim in (45), let us consider the example in (50) and the reading in (51).

(50) *kanarinokazu-no ginkoo-ga mittu-no zidoosya gaisya-ni* Toyota-no torihikisaki-o syookaisita.
'*a good number of banks* introduced to *three automobile companies* Toyota's customers.'

(51) $^{YES}\exists Y(Y \subseteq \mathit{automobile\text{-}company} \wedge |Y| = 3)\ \forall y(y \in Y)\ [\exists X(X \subseteq \mathit{bank} \wedge |X| = k)\ \forall x(x \in X)$ [x introduced to y Toyota's customers]], where k is a number that is considered as large in a given context.

Given the claim in Section 4.3, (51) is derived when (50) is interpreted by means of Omega Predication. Thus, the subject NP is within the ω-Predicate. Now consider (52) and the reading in (53).

(52) *kanarinokazu-no ginkoo-ga mittu-no zidoosya gaisya-ni* soko-no torihikisaki-o syookaisita.
'(Lit.) *a good number of banks* introduced to *three automobile companies* its customers.'

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[6] I owe Daisuke Bekki (p.c. Dec. 1998) for this formalism.

(53) $^{NO}\exists Y(Y \subseteq \textit{automobile-company} \wedge |Y| = 3)\ \forall y(y \in Y)\ [\exists X(X \subseteq \textit{bank} \wedge |X| = k)\ \forall x(x \in X)$ [x introduced to y x's customers]], where k is a number that is considered as large in a given context.

(52) contrasts minimally with (50). In (52), the subject NP is related to a dependent term. DR <non-subject NP, subject NP> in (53) is not one of the readings for (52).

It should be noted that the subject NP can be related to a dependent term when it is not in an ω-Predicate. The DR in (54), which need not be derived by means of Omega Predication, is one of the readings for (52). Hence, (45) has received support.

(54) $^{YES}\exists X(X \subseteq \textit{bank} \wedge |X| = k)\ \forall x(x \in X)\ [\exists Y(Y \subseteq \textit{automobile-company} \wedge |Y| = 3)\ \forall y(y \in Y)$ [x introduced to y x's customers]], where k is a number that is considered as large in a given context.

Within an ω-Predicate, NP's do not have the interpretive possibilities that they normally have. To account for this, I postulated the ω-Predicate Formation hypothesis.

6 Concluding Remarks

In this paper, I have argued that a given sentence can be interpreted "directly" from the LF representation, or by means of Omega Predication. In the case of the former, DR <NP_1, NP_2> is derived if and only if NP_1 c-commands NP_2, and NP_1 is interpreted as NP^I. In the case of the latter, DR <NP_1, NP_2> is derived only if the following conditions are met. (i) There is an ω-position unfilled at LF, that c-commands both NP's, (ii) both NP_1 and NP_2 are interpreted as Group Existential (NP^E) at LF, and (iii) there is a set in the domain of the speaker's direct experience, which can be denoted by NP_1. Among the implications of this paper are that (i) QR in May 1997 is not necessary in deriving DR <non-subject NP, subject NP>, and that (ii) in the environments where a given sentence has to be interpreted "directly" from its LF representation, the Scope Principle of Reinhart 1976 holds.

This work should be placed among the projects which attempt to isolate phenomena that are purely grammatical from those that are not; e.g. Hoji 1998. I believe that this work has established a means to probe into the nature of some syntactic properties that are sensitive to c-command, based upon the availability of DR's.

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The Reduplicative Nature of the Bulgarian Definite Article

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In this paper I argue that the definite article of Bulgarian consists of an empty mora and an unlinked (floating) *t*. The content of the empty mora is determined by constraints that are familiar from reduplicative morphology. In this respect the definite article acts as a reduplicant. Constraints governing the morphology-phonology interface determine the position of the floating *t*.

An important consequence of this analysis is that the behavior of the definite article can straightforwardly be explained in Yearley's (1995) theory of yer vocalization without complicating its underlying representation. A second favorable consequence is that it becomes possible to understand why in certain environments the vowel of the definite article is lowered. Lowering can be seen as an instance of the peak's affinity for segments of relatively low sonority.

The article is structured in the following way. In the first section I present the problem; it is shown that, apparently, the definite article must be assigned an underlying yer. In the second section I show that, on closer view, this is not necessary; all phonological properties of the definite article can be explained if it is assumed that it consists of an empty mora and a floating *t* at the underlying level. A system of ranked constraints decides how the empty mora will be filled, and where the floating *t* will be realized. In the last section I show that this analysis allows us to understand the lowering phenomenon.

1 The Problem

Like all Slavic languages, Bulgarian has at least two yers, vowels that alternate with zero. In Bulgarian the two yers are realized respectively as schwa, and as the front, mid vowel *e*. The forms in (1) illustrate these alternations [1].

(1)	borec	'fighter, sg.'	borci	'fighter, plur.'
	orel	'eagle, sg.'	orli	'eagle, plur.'
	gorək	'bitter, masc. sg.'	gorka	'bitter, fem. sg.'

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[1] All Bulgarian examples are taken from Scatton (1983), a classical generative account of all major aspects of Bulgarian word level phonology, and Scatton (1984), a comprehensive reference grammar. With one exception I have adopted Scatton's orthography: I have represented the schwa with the regular IPA symbol.

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The appearance of the vowels in the forms on the left in (1) cannot be seen as a simple case of epenthesis. This is easy to demonstrate. Notice that in some of the forms the vowel is located in between a liquid and an obstruent. In Bulgarian there are many examples with the same consonantal sequence, but without an intervening vowel. In other words, in the same environment there is a contrast between a vowel's absence and its presence. This shows that, at least in certain environments, the yers of Bulgarian are not simply epenthetic.[2] Examples demonstrating that a sequence of a liquid and an obstruent is not always broken up are given in (2).

(2)	vəlk	'wolf'
	sərp	'sickle'
	spirt	'alcohol'

In standard generative accounts of Slavic yers it is claimed that an underlying yer is realized if the next vowel is also a yer. In all other environments the underlying yer is deleted (cf. Rowicka (1999) for an exhaustive overview of the literature). In the tradition of Bulgarian linguistics a similar analysis has been proposed in Scatton (1983). Thus, in the examples in (1) the appearance of the vowel is explained by the fact that the masc. sg. marker of nouns and adjectives is a yer. This yer triggers the vocalization of the preceding yer. It does not appear at the surface itself, because, not being followed by another yer, it is deleted. The traditional view is sketched in (3).

(3)	underlying representations[3]	surface realizations
	borEcə	borec
	gorəkə	gorək
	borEci	borci

Recently, Yearley (1995) has proposed a rather different theory about the factors determining a yer's realization. She proposes that a yer is realized in order to block the appearance of a consonant cluster in coda position. In this respect a yer resembles an epenthetic vowel. Yet, a yer cannot be seen as a truly epenthetic vowel, as I have just explained. Yearley explains the partly epenthetic, partly non-epenthetic nature of yers in the following way. First of all she assumes that a yer lacks a mora at the underlying level. Secondly, she postulates a system of ranked constraints, which decides whether the moraless vowel receives a mora, or is deleted.[4]

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[2] This is not to say that in Bulgarian the yer is never epenthetic. Bulgarian differs from other Slavic languages, like Russian and Polish, in that it does not tolerate a sequence of consonants of increasing sonority. A sequence of this type is always broken up by a schwa yer.

[3] To distinguish yers from normal (non-alterating) vowels I represent the former with capital letters. In classical generative accounts there are two theories about the phonological structure of yers. According to one theory yers are lax vowels, whereas non-alternating vowels are tense. According to the second theory, yers are prosodically deficient; they lack a mora (or timing slot) at the underlying level.

In a case like *borEc* the second vowel does not have a mora underlyingly. Insertion of a mora violates DEP-μ. On the other hand, deletion of the vowel results in a consonant cluster. This constitutes a violation of NOCOMCOD. Since insertion of a mora is preferred over a complex coda, NOCOMCOD is ranked higher than DEP-μ. The proof of the argument is given in the tableau in (4).

(4) NOCOMCOD » DEP-μ

borEc	NOCOMCOD	DEP-μ
borc	*!	
☞ borec		*

In those cases where there is no threat of a complex coda the underlying yer is deleted. This entails that deletion of an underlying vowel is preferred over insertion of a mora, which suggests that DEP-μ is ranked higher than MAX-V. This is demonstrated in the tableau in (5).

(5) DEP-μ » MAX-V

borEci	DEP-μ	MAX-V
boreci	*!	
☞ borci		*

In those cases where there is no underlying yer no vowel can be inserted to break up a consonant cluster. This suggests that the constraint DEP-V is ranked higher than NOCOMCOD. The proof of the argument is given in the tableau in (6).

---

[4] Yearley's analysis of Russian yers is embedded in a model of Optimality Theory that is based on the principle of Containment (cf. McCarthy and Prince 1993). I have changed the analysis in order to make it compatible with the model of Optimality Theory that is based on Correspondence (McCarthy and Prince 1995). These changes are only superficial; they do not affect the essence of Yearley's proposals in any way.

(6) DEP-V » NOCOMCOD

spirt	DEP-V	NOCOMCOD
spirət	*!	
☞ spirt		*

Combining the three hierarchies we get the system in (7). It is this system which decides whether an underlying yer is realized or deleted.

(7) DEP-V » NOCOMCOD » DEP-μ » MAX-V

Let us now go back to the masc. sg. of nouns and adjectives. We have seen before that the classical theory maintains that, at the underlying level, lexical items of this type are followed by an inflectional ending containing a yer. This is crucial, because only under this assumption it can be explained why in certain nouns (and adjectives) a vowel appears (cf. (3) for exemplification). On the other hand, in Yearley's proposal it would be quite disturbing to postulate a yer in the masc. sg. inflectional ending. The constraint system in (7) would then wrongly predict that the yer is realized if the inflectional ending follows two consonants. To see why this is the case, consider a form like *spirt* (cf. (2)). In (8) I show that **spirtə* is the predicted outcome.

(8)

spirtə	DEP-V	NOCOMCOD	DEP-μ	MAX-V
spirt		*!		*
☞ spirtə				

Faced with this problem it seems necessary to assume that masc. nouns and adjectives are not followed by a yer in the singular. The problem that I want to address now is the fact that the definite article seems to offer good evidence for the hypothesis that the singular marker of masculine nouns and adjectives does consist of a yer at the underlying level.

Feminine, singular nouns and adjectives are normally marked by the vowel *a*. Neuter, singular nouns (and adjectives) are normally marked by the vowel *o*. When the definite article is added to items of these two classes it has the following structure: it begins with *t*, which is then followed by a repetition of the vowel that immediately precedes the *t*. Examples are given in (9).

(9)	kniga	'book, fem. sg.'	knigata	'book, fem. sg., def.'
	koza	'goat, fem. sg.'	kozata	'goat, fem. sg., def.'
	meso	'meat, neut., sg.'	mesoto	'meat, neut., sg., def.'
	selo	'village, neut., sg.'	seloto	'village, neut., sg., def.'

It is clear that the vowel of the definite article is identical to the vowel of the inflectional ending marking the preceding noun (or adjective). In the Bulgarian linguistic tradition this is normally explained by the hypothesis that the definite article is not only preceded, but also followed by an inflectional ending. Furthermore, the vowels of the two inflectional endings surrounding the definite article are identical, at least in most cases. This analysis makes an interesting prediction. If the masc. sg. inflectional ending contains a yer, and if, furthermore, the definite article is surrounded by two identical inflectional endings, then it is predicted that in the masc. sg. the first yer is realized, whereas the yer of the second inflectional ending is deleted. This prediction is a result of the classical theory of yer vocalization, which maintains that a yer is realized if and only if the next vowel is also a yer. It turns out that this prediction is correct, as is shown by the examples in (10).

(10)	grad	'city, masc. sg.'	gradət	'city, masc. sg. def.'
	vol	'thief, masc. sg.'	volət	'thief, masc. sg. def.'
	vəlk	'wolf, masc. sg.'	vəlkət	'wolf, masc. sg. def.'

It is clear, then, that in the classical theory the appearance of the vowel preceding the *t* of the definite article can be explained in a very straightforward way. It simply follows from the morphological structure combined with the basic hypothesis that a yer is realized if and only if it is followed by another yer.

In the theory proposed by Yearley, on the other hand, it seems necessary to complicate the underlying structure of the definite article. Apparently, we are forced to add a yer to the left of *t*. The new yer appears only in those cases when there is a threat of a consonant cluster in coda position. This happens only in the singular of masc. nouns and adjectives, where (in Yearley's theory) the definite article is not followed by an inflectional ending . This analysis is illustrated in (11).

(11) underlying representations	surface representations
vol+Ət	volət
knig+a+Ət+a	knigata
sel+o+Ət+o	seloto

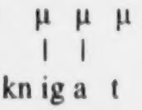
In this article I want to point out, however, that there is a possibility to avoid complicating the analysis of the definite article. I want to argue that at the underlying level the definite article consists of an empty mora and a floating *t*. A system of ranked constraints, familiar from reduplicative morphology, decides in what way the empty mora is filled and where the floating *t* is realized. Although, strictly speaking, in this view the underlying structure of the definite article is more complicated than the traditional one (which only consists of a *t*), the analysis as a whole is not, because the new underling representation allows us to get rid of the inflectional endings following the definite article. This means that Yearley's theory of yer vocalization does not necessitate us to complicate the analysis of the definite article as a whole. Independent evidence for this approach comes from the lowering process operating in the plural of non-neuter nouns. It becomes possible to understand this phenomenon as a case of the emergence of the unmarked. The empty mora is filled with a relatively low vowel, because syllable peaks favor low vowels over high vowels.

In this view the definite article is a reduplicant. It is treated as a morpheme which is (at least partly) unspecified and which receives its content from its base. Let us now turn to the constraint system that decides how the abstract underlying representation of the definite article is realized.

2 A New Proposal

In the new proposal the structure of a representative feminine, singular noun like *kniga*, followed by the definite article is as follows:

(12)



In the optimal candidate the vowel of the inflectional ending following the root must be copied in order to fill the empty mora. To obtain this result we must first of all ensure that neither the candidate in which the empty mora is deleted, nor the candidate in which the empty mora remains empty is optimal. This suggests that the constraints NoEmptyMora and Max-μ are high in the hierarchy. Here I assume that they are undominated. Max-μ will be left out of further consideration.

More importantly, we must also ensure that the empty mora is filled by a copy of the inflectional ending, rather than by some independent vowel. The constraint requiring copying is Max-BR. It states that the segments of the base must have a correspondent in the reduplicant. Obviously, just one segment of the base is reduplicated. This indicates that the constraint Dep-S(egment) is higher ranked than Max-BR. This effectively blocks reduplication, unless it must apply to fill the empty mora. Recall that NoEmptyMora is undominated, as I have just suggested. The following ranked constraints account for the fact that one and only one vowel is copied. This is the vowel that fills the empty mora of the definite article.

(13) NoEmptyMora » Dep-S » Max-BR

In the tableau in (14) I demonstrate how this system works.

(14)

μ μ μ | | kni ga t	NoEmptyMora	Dep-S	Max-BR	Ident(F)
μ μ μ ☞ | | | kni g a_5 t a_5		*	****	
μ μ μ | | | kni ga_5 t ə		*	*****!	
μ μ μ | | | kni ga_5 t $ə_5$		*	****	*!
μ μ μ | | kni ga_5 t	*!			

In this tableau I have marked the correspondence relation holding between the fifth segment of the base and the segment in the reduplicant with subscripts. In the second candidate no segment of the base has a correspondent. Hence, it has five violation marks under Max-BR. The fifth mark is fatal, because the first candidate has only four violations. In the third candidate the final vowel of the base does have a correspondent in the reduplicant. However, the two corresponding vowels are not identical. This is a fatal violation of IDENT(F), the constraint that requires that the features of corresponding segments be identical. It is not possible to determine the position of this constraint with respect to the other constraints, because there is no conflict. This is expressed by the dotted line separating MAX-BR and IDENT(F). All candidates, except the final one, violate DEP-S, because they have a vowel that is not present in the input. However, satisfaction of DEP-S by the last candidate leads to a violation of NOEMPTYMORA, which dominates DEP-S. It is clear, then, that the first candidate is optimal.

Although, at the underlying level, no linear order is specified between the mora and the *t*, it is clear that in the optimal candidate the *t* precedes the copied vowel. If the order would be reversed, then the copied vowel would immediately follow the inflectional ending, creating a long vowel, or an onsetless syllable.

So far we have seen that in feminine nouns and adjectives the vowel of the definite article is a copy of the preceding inflectional ending, and that the *t* of the definite article precedes the copied vowel. Normally, the definite article behaves in exactly the same way in neuter nouns and adjectives. From *seló*, for instance, we get *seloto* (cf. (9)). There is one environment, however, where the copied vowel following neuter nouns or adjectives is not identical to the vowel of the inflectional ending. This happens when the inflectional ending undergoes fronting, a process that changes underlying *o* to *e*. Fronting applies after alveopalatal consonants, palatalized consonants, and after the affricate *c*. The process of fronting and its interaction with reduplication is illustrated in (15).

(15)	lice	'face, neut., sg.'	liceto	'face, neut., sg. def.'
	pole	'field, neut., sg.'	poleto	'field, neut. sg. def.' [5]
	naše	'our, neut., sg.'	našeto	'our, neut. sg. def.'

In the analysis developed so far, it is difficult to understand how the content of the underlying inflectional ending can be visible for the reduplicant. The reason is that I have operated on the assumption that there is no correspondence relation between the reduplicant and the input. In this way it can be explained very easily why just one segment is copied from the base; it follows from the fact that DEP-S dominates MAX-BR (cf. (14) for the illustration).

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[5] This form must have a palatalized consonant at the underlying level, because the plural is *pol'a*, rather than **pola*. In Bulgarian the palatal element can only surface immediately before a back vowel. That is why in the singular the final segment of the root is depalatalized.

I can only very briefly sketch a possible solution to this problem. Obviously, the underlying quality of the inflectional ending must somehow be made accessible to the reduplicant. This can be done in the framework of Sympathy Theory, recently proposed in McCarthy (1997). Suppose that the candidate which preserves the underlying quality of the vowel is the sympathetic candidate. This result can be obtained if it is assumed that IDENT(F)-IO, a faithfulness constraint controlling the correspondence relations between input and output, selects the sympathetic candidate. The sympathetic candidate paralleling the optimal candidate *liceto* would then be *licoto*. Notice now that the optimal candidate *liceto*, where the copied vowel is not identical to its source in the base, is more faithful to the sympathetic candidate than the candidate *licete*, in which the vowel of the reduplicant is identical to the vowel of the base. This shows that IDENT(F)-SYM, a faithfulness constraint controlling the correspondence relation between any output candidate and the sympathetic candidate, dominates IDENT(F)-BR, the faithfulness constraint which controls the correspondence relation between the reduplicant and the base. In its turn IDENT(F)-SYM must be dominated by FRONTING, otherwise the process would never have visible effects. This hierarchy, listed in (16), is illustrated in (17).

(16) FRONTING » IDENT(F)-SYM » IDENT(F)-BR

(17)

μ μ μ li co t	FRONTING	IDENT(F)-SYM	IDENT(F)-BR
licoto	*!		
licete		**!	
☞ liceto		*	

The first candidate fatally violates FRONTING. The second candidate violates faithfulness to the sympathetic candidate (i.e. *licoto*) twice. The second violation is fatal, because the third candidate violates it only once.

In the masc. sg. the mora of the definite article is filled by a schwa. Furthermore, the *t* of the definite article follows the schwa. Examples illustrating this pattern have been given in (10). The first question we have to answer is why in the masc. sg. the empty mora is not filled by a copy of the preceding vowel. We can solve this problem with the constraint LINEARITY and by relativizing it to morphological structure. According to LINEARITY the linear order of a string of segments must be maintained by the string of corresponding segments. If in the input sequence V_1C_2 the vowel is copied over the consonant, yielding the sequence $V_1C_2V_1$, then the LINEARITY constraint is obviously violated. In the input string the vowel precedes the consonant, but in the output its correspondent follows the consonant (although another correspondent precedes the consonant). Let us now make a distinction between a specific constraint LINEARITY(*Stem*) and a general constraint LINEARITY. The specific constraint is ranked above the general constraint, and MAX-BR is ranked in between them. We thus get the following ranking:

(18) LINEARITY(*Stem*) » MAX-BR » LINEARITY

As a consequence of this ranking a vowel can only be copied from an inflectional ending, because an inflectional ending is not located in the morphological stem. In the masc. sg., however, there is no inflectional ending. Hence, vowel copy is blocked, and vowel insertion takes over. The analysis is illustrated in the tableau in (19).

(19)

μ μ grad t	LINEARITY (*Stem*)	MAX-BR	LINEARITY
μ μ ☞ gra$_3$d ət		****	
μ μ gra$_3$da$_3$t	*!	***	*

The first candidate is a complete failure with respect to MAX-BR. Nonetheless it is optimal, because any attempt to improve on MAX-BR leads to a violation of LINEARITY(*Stem*), as is shown by the second candidate.

This solution closely follows a proposal of McCarthy and Prince (1995). McCarthy and Prince propose to split up the family of faithfulness constraints into two subsets, one applying in the domain of roots, the other in the domain of affixes. The proposal made here extends this original idea by making a further bifurcation between faithfulness constraints applying in the domain of inflectional endings and constraints applying in the stem. There is independent evidence supporting this idea. In many languages the phonological content of inflectional endings is extremely restricted compared to what is allowed in roots and derivational affixes. Dutch is a typical example of such a language. In Dutch the inflectional endings can only contain a schwa or a coronal consonant, or both. No such restriction holds in other morpheme types.

The second question we have to answer is why, in the masc. sg., the vowel of the definite article is schwa. Apparently, in Bulgarian the schwa is a kind of default vowel. The default status of schwa in Bulgarian is confirmed by the fact that it can function as an epenthetic vowel. In Bulgarian a coda consonant cluster of rising sonority is not allowed. In this respect Bulgarian differs sharply from other Slavic languages, like Russian and Polish. In Bulgarian, but not in Russian and Polish, a sequence of coda consonants of rising sonority is avoided by epenthesis of schwa. Examples showing that schwa can be epenthetic are given in (20).

(20) Bulgarian		Russian	
filtər	'filter'	fil'tr	idem
bodər	'alert, adj., masc. sg.'	bodr	'energetic, adj., short form'
podəl	'base, adj., masc. sg.'	podl	'mean, adj., short form'
krəgəl	'round, adj., masc. sg.'	krugl	'round, adj., short form'

In OT the default status of a given segment is explained in terms of constraint ranking. To account for the Bulgarian case I propose that schwa lacks place features, and that the constraint ruling out empty place nodes is ranked below the constraint penalizing the presence of vocalic place features. Of course, this should not lead to the elimination of place features that are present in underlying forms. We thus have to rank IDENT(F)-IO above the constraint that penalizes the presence of place features. This leads to the following subhierarchy:

(21) IDENT(F)-IO » *VOCPF » *EMPTYPN

In the tableau in (22) I show that this hierarchy enforces insertion of schwa. I have taken into consideration only candidates in which there is no correspondence relation between an input vowel and the vowel of the definite article.

(22)

μ μ grad t	Ident(F)-IO	*VocPF	*EmptyPN
μ μ gradit		**!	
μ μ ☞ gradət		*	
μ μ grədət	*!		

In the first candidate the empty mora is filled by *i* creating a (second) violation of *VocPF, which is fatal. In the third candidate there is no vocalic place node. This, however, creates a (fatal) violation of Ident(F)-IO, because the underlying *a* has been changed to schwa. Consequently, the second candidate is optimal.

It should be mentioned that *VocPF is also crucially dominated by Max-BR and Ident(F)-BR. This ranking ensures that, if reduplication can apply (i.e. if there is an inflectional ending), it has to apply. In this way insertion of schwa is preempted by reduplication. This ranking, made explicit in (23), is illustrated in (24).

(23) Max-BR, Ident(F)-BR » *VocPF

(24)

μ μ kniga t	Ident(F)-IO	Max-BR	Ident(F)-BR	*VocPF
☞ kniga$_5$ta$_5$		****		***
kniga$_5$tə$_5$		****	*!	**
kniga$_5$tə		*****!		**
knigə$_5$ tə$_5$	*!	****		*

The first candidate is optimal, because it best satisfies the BR-faithfulness constraints, even though this creates additional place features.

The third problem concerning the realization of the definite article in the masc. sg. is the fact that the only fixed segment of this morpheme, *t*, is realized after the vowel. Why, in other words, do we get *volət*, rather than **voltə*. In fact this problem is easy to solve. Both forms are identical in syl-

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lable structure in all relevant respects. However, the second form violates the constraint ANCHOR, which says that if a segment occupies the edge position of some designated morphological constituent, then its correspondent should occupy the same edge position of a designated phonological constituent. Notice now that in the masc. sg. the *t* of the definite article occupies the final position of the morphological word. If the epenthetic schwa is inserted before *t*, then *t* also occupies the final position of the phonological word. This is fine with respect to ANCHOR. On the other hand, if the epenthetic vowel is inserted after *t*, then ANCHOR is violated. Although at the underlying level *t* occupies the final position of the morphological word, its correspondent does not occupy the final position of a phonological word. This is illustrated in (25).

(25) underlying representations

$$\begin{array}{ccccccc} & & \mu & & \mu & & \\ & & | & & & & \\ | & v_1 & o_2 & l_3 & & t_4 & | \end{array} \qquad \begin{array}{ccccccc} & & \mu & & \mu & & \\ & & | & & & & \\ | & v_1 & o_2 & l_3 & & t_4 & | \end{array}$$

surface representations

$$\begin{array}{ccccccc} & & \mu & & \mu & & \\ & & | & & | & & \\ \{ & v_1 & o_2 & l_3 & ə & t_4 & \} \end{array} \qquad \begin{array}{ccccccc} & & \mu & & & \mu & \\ & & | & & & | & \\ \{ & v_1 & o_2 & l_3 & t_4 & ə & \} \end{array}$$

There are two constraints that conflict with ANCHOR: CONTIGUITY and ONSET. CONTIGUITY requires that corresponding segments are a contiguous string. Insertion of schwa to the left of *t* creates a violation of this constraint, as is shown the subscripts in (25). Since schwa is inserted to the left of *t* ANCHOR dominates CONTIGUITY. In its turn ANCHOR is dominated by ONSET. We have seen that a copied vowel follows the *t* of the definite article, violating ANCHOR. If the order would be reversed, then ONSET would be violated. We thus get the following rankings:

(26) ONSET » ANCHOR » CONTIGUITY

Let me now summarize this section. I have argued that the definite article can be represented as an empty mora and a floating *t* at the underlying level. A system of ranked constraints accounts for the precise surface realization of the definite article. If an inflectional ending is available then the definite article receives a copy of the vowel of the inflectional ending. The copy is inserted after the *t*. If no inflectional ending is available, as in the masc. sg., then a schwa is inserted to the left of *t*. I now will turn to a process of vowel lowering. This process can be interpreted as independent evidence for the proposed analysis.

3 Lowering

In the plural of masc. and fem. nouns and adjectives the inflectional ending is *i*. Interestingly, in this case the copied vowel is not identical to the inflectional ending. It shares its place features, but not its aperture features. We thus get *e*, rather than *i*. Examples are given in (27).

(27) singular	plural	definite plural	
kniga	knigi	knigite	'book'
koza	kozi	kozite	'goat'

In our analysis it is easy to understand this phenomenon. We can rely on Prince and Smolensky's (1993) approach to Berber syllabification. To account for syllabification in Berber Prince and Smolensky propose that the sonority hierarchy is mapped onto a set of constraints. One subset of these constraints relates vowel height to the syllable's peak position. These constraints are given in (28), together with their ranking.

(28) *N/I » *N/E » *N/A

The leftmost constraint excludes high vowels from the nucleus position. It dominates the second constraint, which disallows mid vowels in nucleus position. In its turn, this constraint is ranked higher than the rightmost constraint, which disallows low vowels in nucleus position. Lowering can simply be explained if we split up IDENT(F)-BR into two constraints: IDENT(Place Feature)-BR and IDENT(Height Feature)-BR. The former dominates the latter, and in between them *N/I is ranked. In this way, the vowel in the reduplicant is a lowered version of its source in the base, but lowering may not lead to a change in place features. Accordingly, *i* is lowered to *e*, not to *a*. Of course, an underlying high vowel is not lowered, which implies that IDENT(F)-IO dominates *N/I. We thus postulate the following rankings:

(29) IDENT(F)-IO, IDENT(PF)-BR » *N/I » IDENT(HF)-BR

The hierarchy is illustrated in the following tableau:

(30)

μ μ μ kozi t	IDENT(F)-IO	IDENT(PF)-BR	*N/I	IDENT(HF)-BR
koziti			**!	
kozita		*!	*	
kozete	*!			
☞ kozite			*	

The fact that only the vowel of the definite article undergoes lowering is difficult to understand in the standard account. Why should there be a difference between the two inflectional endings surrounding the definite article? In this framework we have to write an ad hoc rule (or constraint) requiring that a front high vowel is lowered if it is in the domain of an inflectional ending, and if it follows a front high vowel which is also located in an inflectional ending.

In my analysis, on the other hand, the special behavior of the high vowel of the definite article is explained in a natural way. In this view the definite article is a reduplicant. Hence, a special set of faithfulness constraints, FAITHFULNESS-BR, controls its structure. If the relevant member of this set is ranked below the constraint requiring lowering, the difference between the copied vowel and the underlying high vowel is explained. This constitutes strong evidence for the hypothesis that the Bulgarian definite article is a reduplicant.

In this paper I have argued that the Bulgarian definite article is a reduplicative morpheme. One consequence of this analysis is that Yearley's theory of yer vocalization can be extended to Bulgarian without complicating the representation of the definite article. The second advantage is that it is possible to understand why the vowel is lowered in the definite article; low vowels are favored in the syllable's peak position. Due to constraint ranking lowering can only take effect in the reduplicant, a clear case of the emergence of the unmarked.

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The Origin of the Pre-Ossetic Oblique Case Suffix and its Implications

Ronald Kim

1 The Problem: Oblique *-i* in Ossetic and Elsewhere[1]

Ossetic is a modern Iranian language spoken in the central Caucasus by approximately half a million people, who are believed to be descended from the ancient Scythian and Sarmatian and medieval Alanic nomads who dominated the steppes from the Black Sea to Central Asia during the 1st millennium BC until perhaps the 7th or 8th centuries AD. Due to its position as the sole modern representative of Northeast Iranian, as well as its isolation from other Iranian languages for well over a thousand years, the language has undergone numerous idiosyncratic developments and often preserves startling archaisms. Ossetic occurs in two major dialects, the more conservative Digor (D) and innovative Iron (I); the latter is spoken by a large majority of Ossetes and provides the basis for the modern literary language.

Among the modern Iranian languages, Ossetic is distinguished by its complex system of nominal case inflection, exemplified by the following paradigms for *bæx* 'horse':

	Digor	pl.	Iron	pl.
nominative	*bæx*	*bæx-tæ*	*bæx*	*bæx-tæ*
genitive	*bæx-i*	*bæx-t-i*	*bæx-y*	*bæx-t-y*
dative	*bæx-æn*	*bæx-t-æn*	*bæx-æn*	*bæx-t-æn*
allative	*bæx-mæ*	*bæx-tæ-mæ*	*bæx-mæ*	*bæx-tæ-m*
ablative	*bæx-æj*	*bæx-t-æj*	*bæx-aej*	*bæx-t-æj*
inessive	*bæx-i*	*bæx-t-i*	*bæx-y*	*bæx-t-y*
adessive	*bæx-bæl*	*bæx-tæ-bæl*	*bæx-yl*	*bæx-t-yl*
comitative	(*bæxi xæccæ*)	(*bæxti xæccæ*)	*bæx-imæ*	*bæx-t-imæ*
equative	*bæx-au*	*bæx-t-æu*	*bæx-au*	*bæx-t-au*

The "genitive" is also used to mark definite (direct) objects and is found in a variety of other argument and locatival roles, as a result of which it is often referred to as the "oblique". The comitative, expressing accompaniment ("with a horse"), is found only in Iron; in its place the Digor dialect uses gen. *-i* followed by the postposition *xæccæ*.

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[1] An earlier version of this paper was presented at the 23rd Penn Linguistics Colloquium at the University of Pennsylvania, 27–8 Feb 1999. Thanks in particular to David Testen for introducing me to the study of Ossetic. I of course remain entirely responsible for all views and errors contained herein. H.V.S.

Despite a century of study, the origins of several of these case markers remain the topic of continuing disagreement. Though most scholars derive adess. D *-bæl* < postposed PIran. *upari 'on, above, at' (Av. *upairi*, OP *upariy*, Skt. *upári*; further reduced to I *-yl*) and compare dat. D, I *-æn* with other modern East Iranian forms such as Waxī *-en*, *-an* (Weber 1980:133), there is at present no consensus on the prehistory of gen./iness. D *-i*, I *-y* and abl. D, I *-æj*. In his pioneering historical grammar of Ossetic, Miller (1903:43-4) considers D *-i*, I *-y* < Proto-Ossetic *-i to reflect PIran. *-iya- < PIE *-iyo-, the well-attested suffix forming relational adjectives from nouns, well-attested in Indo-Iranian, Anatolian (Melchert 1990), Greek, and Italic[2]. Though phonologically plausible, it is at least somewhat peculiar that an original adjectival formation should have become *the* default oblique case and the basis for a whole new series of secondary cases. More problematically, one would have to assume a generalization from relational ('of, pertaining to X') to locatival and definite object function, among others. This is perhaps not unthinkable, but at present I prefer to pursue an alternative origin for obl. *-i without necessarily rejecting's Miller's suggestion out of hand.

More recently, Bielmeier (1982:66-7) takes the Ossetic gen./iness. from PIran. gen. sg. *-ah of consonant-stems. This, however, stands in direct contradiction to the zero-ending of most nouns in both dialects, which can hardly reflect anything other than PIran. *a*-stem nom. sg. *-ah. Thordarsson (1989:459, 470-1), on the other hand, sees in this ending an earlier conflation of PIran. gen. sg. *-ah and loc. sg. *-yā of original PIran. root nouns, whereas for abl. *-æj* he assumes a phonetic merger of the reflexes of *ā*-stem gen./abl. *-āyāh and instr. *-ayā (pp. 459, 471).

That the old PIran. root-noun or consonant-stem inflection would have ousted the inflectional systems of the rapidly expanding classes of *a*- and *ā*-stems in the prehistory of Ossetic is *a priori* improbable. A more serious defect of these explanations, however, is their appeal to, and selection from, the wide variety of PIran. declensions and case-endings. This methodological shortcoming is known to scholars of creole genesis as the Cafeteria Principle, i.e. the practice of attributing the origin of individual features of a given creole to superstrate influence from a random English dialect, or to any number of possible West African substrates (Arends et al. 1995:100, 328).

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[2] Miller (1903:44) derives abl. *-æj* from PIran. *o*-stem gen. *-ahya, which presupposes a prehistoric merger of abl. with gen. in thematic nouns and subsequent replacement of the reflex of *-ahya by the relational adj. ending in genitival function.

Bielmeier and Thordarson fail to explain why certain case-endings of certain classes were generalized to all nouns, and additionally do not state what happened to the rest of the Old Iranian case system.

Testen (1996:370-2) rightly emphasizes that one must take into account the diachronic evolution of the morphological system of the language as a whole. In his brief discussion of the prehistory of Ossetic nominal inflection, he argues instead that the reconstructed PIE, Proto-Indo-Iranian, and PIran. inflectional system of eight cases was already vastly reduced in pre-POss. to two cases, unmarked nominative or "direct" *-Ø and oblique *-i, as in contemporary Yaghnōbī[3]. The subsequent buildup of "secondary" cases through grammaticalization of postpositions left the bare obl. *-i confined to the functions of definite direct object, genitive, and inessive (locative).

Such a scenario accounts for the primary role of the oblique-locative within the Ossetic case system and the relatively wide variety of theta- and locatival roles which it can express. In support of this view, Testen refers to the clitic personal pronouns, in which the former pre-POss. general oblique clitic survives as such in the unmarked, unsuffixed gen./abl./iness. 1sg. *mæ*, 2sg. *dæ*, 1pl. *næ*, 2pl. *wæ*, 3pl. *sæ*[4]. As for abl. *-æj* , Testen prefers a derivation from postponed PIran. *hača (1996:370, fn.18; cf. Miller 1903:44 with refs.), comparing the OP abl. construction *hačā̆-ma* 'from me' with secondary enclitic *-ma* vs. tonic Av. *maṯ*, Skt. *mát* (1996:362fn.8).

In what follows I will propose an origin for the pre-POss. obl. case ending *-i suggested by Testen by considering the prehistory of obl. case markings in the closest attested East Iranian relatives of Ossetic. Specifically, Sims-Williams's (1982) convincing analysis of the origin of obl. *-ī* in Sogdian (the lingua franca of trade along the Silk Road in medieval Central Asia up to the Islamic conquest, and a vehicle for Buddhist, Manichean, and Nestorian Christian literature), provides a likely sequence of prehistoric sound changes leading up to POss. *-i (§2). This hypothesis has direct consequences for the prehistory of Ossetic stress patterns (§3) as well as the interaction of stress with the historical development of POss. vocalism (§4).

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[3] At least in nominal inflection; pronouns appear to have maintained a three-way case distinction, e.g. in POss. *a 'this', which opposes obl. *a-i —> D, I gen. *a-i*, all. *a-mæ* (or < *am-mæ?) to *am- —> iness. D *am-i* (I am 'here'), D, I dat. *am-æn*, abl. *am-æj* (Weber 1980:130-1, Thordarson 1989:472; for the forms see Miller 1903:53).

[4] As noted by Testen (1996:369), the sg. forms most likely continue PIran. dat. *may, *tay, *hay; atonic *ay > *æ* can have spread to pl. *nah, *wah, *hi(n)š. Also possible is that *næ*, *wæ* are the regular developments of unstressed 1pl. *nah, 2 *wah. On the origin of 3sg. gen. D *æ(j)*, I *æj*, *jæ*, 3pl. gen. D, I *sæ*, and 3sg./pl. abl./iness. D *ʒi*, I *ʒy*, see Testen (1996:363-8).

Finally, the ensuing implications for the subgrouping of medieval and modern (North)East Iranian languages will be briefly considered in §5.

2 Sogdian *-ī* and Yaghnōbī *-i*

As established by Tedesco 1926, our documents of Sogdian reveal the earlier operation of the "Rhythmic Law", by which stress shifts to the first long vowel or diphthong in the (phonological word), including sequences of *Vr before non-glides and *Vm (Sims-Williams 1984), and otherwise falls on the final syllable. This purely phonological change was then followed by a number of stress-conditioned alterations which profoundly affected the inflectional morphology of the language, as well as its morphosyntax. In both noun and verb, the Rhythmic Law results in the creation of two separate stem classes: "light" stems, which consist solely of light, and "heavy" stems, which contain at least one heavy syllable. The parallel declensions for two *a*-stem stems, light *βaγ-* 'god' and heavy *mēθ* 'city', are given below[5]. Note that the Sogdian pl. is formed with the original collective suffix in *-tā and takes sg. fem. (*ā*-stem) endings.

"light"	*βaγ-* 'god' (m.)		pl.	
nom.	*βaγ́*	< *bag-áh	*βaγtá*	< *bag(a)-tā́
acc.	*βaγú*	< *bag-ám	*βaγtá*	< *bag(a)-tā́m
gen.-dat.	*βaγé*	< *bag-ahya	*βaγtyá*	< *bag(a)-tayā́h
loc.	*βaγyá*	< *bag-ayā́	*βaγtyá*	< *bag(a)-tayā́
abl.-inst.	*βaγá*	< *bag-ā́d	*βaγtyá*	< *bag(a)-tayā́

"heavy"	*mēθ* 'day' (m.)		pl.	
nom.	*mēθ*	< *máiθ-ah	*mēθ-t*	< *máiθ(a)-tā
acc.	*mēθ*	< *máiθ-am	*mēθ-t*	< *máiθ(a)-tām
gen.-dat.	*mēθ*	< *máiθ-ahya	*mēθ-tī*	< *máiθ(a)-tayāh
loc.	*mēθ-ī*	< *máiθ-ayā	*mēθ-tī*	< *máiθ(a)-tayā
abl.-inst.	*mēθ*	< *máiθ-ād	*mēθ-tī*	< *máiθ(a)-tayā

In order to account for the contrasting reflexes of the reconstructed PIran. endings in light and heavy stems, i.e. in accented vs. unaccented position, Sims-Williams proposes the following relative chronology of pre-Sogdian vowel changes (1984:203-5, 1989b:182):

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[5] I follow Sims-Williams (1982, 1989b) in denoting light stems with a following hyphen, hence *βaγ-* vs. *mēθ*.

1) shortening of final long vowels;
2) syncope of unstressed short vowels (posttonic only?);
3) *-ya > *-ī (and presumably *-wa > *-ū, if any such examples exist);
4) loss of "suffixal" *k after unstressed *a, with contraction across hiatus of the resulting adjacent vowels;
5) loss of final short vowels: variable reduction of unstressed (pretonic?) short vowels and (sporadic) introduction of epenthetic vowels.

Thus the ending *-ī* in heavy stems continues PIran. endings of the form *-(a)yā(h) and so was originally proper to the locative sg. of masculines, the genitive-dative, locative, and ablative-instrumental sg. of feminines, and the pl. of all nouns. Phonological developments in unstressed final syllables hence produce a synchronically opaque distribution of -Ø vs. *-ī*, almost fully preserved in the archaic Christian ms. C2. Most (later) Sogdian texts have, not surprisingly, simplified this to a two-case agglutinative system opposing nominative -Ø to generalized "oblique" *-ī*:

	sg.	pl.
nom.	*mēθ*	*mēθ-t*
obl.	*mḗθ-ī*	*mḗθ-tī*

Although phonological developments did occasion declensional shifts from one class to the other (e.g. in S *knδth* [kaṁθt] > *kθt* [kaθt] —> C *qθt'* [kaθtá] 'cities', where the loss of the postvocalic nasal resulted in a light first syllable; Sims-Williams 1989b:182), later borrowings and new creations were for the most part inflected according to the strong paradigm, including in particular words containing entirely light syllables, e.g. *kaβnak* 'little', *moγpat* 'chief magus' (Sims-Williams 1984:208, 213). By the time of our documents in Late Sogdian, we can observe a definitive trend towards generalizing the "light" nom. endings (m. *-i*, f. *-a*) and "heavy" obl. *-ī*, as in the following forms of 'god' from the Christian ms. C5: *βaγí* 'god', obl. *βaγi-ī*; pl. *βaγtá*, obl. *βaγta-ī* (Sims-Williams 1982:69-70, 1989b:184-5). Though this process has not yet reached completion in our latest Sogdian texts, note that obl. *-i* has been fully generalized in Yaghnōbī, the lone surviving modern descendant of Sogdian, spoken today by about 2500 people in the Yaghnōb valley in Tajikistan: cf. *kát* 'house', obl. *kát-i*; pl. *kát-t*, obl. *kát-t-i* (Bielmeier 1989b:483).

Sims-Williams's account thus appears to explain the evolution of light vs. heavy inflection, and in particular the increasingly generalized heavy obl. *-ī*. Given the existence of several lexical and morphological isoglosses shared by Sogdian and Ossetic (cf. Bailey 1945, 1946 and see below), one must ask whether a accentual patterning in the prehistory of Ossetic similar to the Sogdian Rhythmic Rule could have accounted for POss. obl. *-i > gen.-iness. D *-i*, I *-y*. To address this question, we must first reconstruct the accentual system of POss. and determine its effects on other prehistoric sound changes, in particular on the treatment of stressed vs. unstressed vowels. This in turn will allow us to better understand the origins of Ossetic nominal inflection as well as draw up a tentative relative chronology of Ossetic historical phonology.

3 Reconstructing Proto-Ossetic Accentuation

It has long been known that the placement of accent in both Iron and Digor is determined by a distinction between "weak" and "strong" vowels; cf. Abaev 1939; Isaev 1966; Thordarson 1989:459, 466; Testen 1997:727. The two classes of vowels for the two dialects are given below:

	weak	strong
Digor	æ i u	a e o (ī[6])
Iron	æ y	a i u e o

Stress in Iron is restricted to the first two syllables of the phrase, i.e. phonological word. The first syllable is stressed if it contains one of the strong vowels; if the vowel is weak, the second syllable receives the stress (Thordarson 1989:466, Testen 1997:727-8). In the following example, the initial syllable of *kúrync* 'they ask' is stressed since its vowel is strong *u*, whereas *nyr-tá-syn-aej* and *sæ-čýzǯ-y* have a weak vowel (*y* and *æ*, respectively) in their initial syllables and so take second-syllable stress.

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[6] A distinctively long vowel phoneme /ī/ has been posited for Digor by Isaev (1954:230ff.), based on minimal pair oppositions such as *dīn* 'religion' (< Arabic) vs. *din* 'you (dat. sg. encl.)', *æxsīnae* 'princess' vs. opt. 1sg. *æxsinæ* 'I would shoot'. Aside from such recent borrowings, for which I have no phonetic evidence for a contrast with short *i*, *ī* appears only before *n*, as a result of a rule raising pre-POss. *ayn > *iyn (or *en > *iyn); cf. Testen 1996:370 (already Miller 1903:18, though he falsely states the outcome as D *i*, I *y*). Testen (1997:724-5) points out that D *ī* appears in environments where one would expect /iy/ on phonological and morphological grounds, e.g. in *adgīnag* 'sweetness' to *adgin* 'sweet' (I *adǯinag*, *adǯyn*, with suffix *-yaka; cf. D *bazajrag* 'bazaar (adj.)' to *bazar* 'bazaar', *x*^{w}*ærujnag* 'food' to inf. *x*^{w}*ærun* 'eat') or D *fī* 'nose' < *fin^{y} < POss. *find' (I *finʒ*, parallel to D *insæj*, I *ssæʒ* 'twenty' < POss. *insæd' < *winsati). Henceforth I follow Testen in excluding /ī/ from the vowel phonemes of Digor; this will play no role in the POss. reconstructions assumed below.

nyr tá syn aej | *kúrync* | *sæ čýzǯ-y*
now again them-dat. 3sg. obl. they ask their daughter-obl.
'Now again they ask them for her, their daughter.'

Abaev (1939:97) provides the following striking accentual minimal pair, in which the grouping of words into phonological units for the purposes of stress determination depends on constituent structure:

bæx nǽ | *qæwý* | *máx*
horse us is needed us
'We need a horse.'

bǽx | *næ qǽwy* | *máx*
horse NEG is needed us
'We don't need a horse.'

By contrast, the accentual system of Digor is not as well understood, and the principal sources do not even agree on the main rules. According to Thordarson (1989:466), stress in Digor follows the same pattern as in Iron, except that "the accent may be retracted to a syllable still farther back if the vowels of the preceding syllables are weak". This implies that, as in Iron, the accent in Digor falls on the first strong vowel of the (phonological) word. Others, however, claim that the *last* strong vowel is stressed (Isaev 1966:26-7, cited in Testen 1997:727), as in the following example:

ba-	*din-*	*æj-*	*jés-*	*ǯænæn*
prevb.	2sg. dat.	3sg. obl.	take	FUT 1sg.

'I'll take it away from you.' (Testen 1996:359;
Iron *ba-js-ǯynæn dyn æj* without 'tmesis')

Both authors agree that if all the vowels in a Digor word are weak, stress falls on the final syllable, e.g. in *næ tikís* 'our cat'[7].

Despite their differences, the accentual patterns of Iron and Digor should permit the reconstruction of a Proto-Ossetic accentual system. The restriction of the accent to the first two syllables in Iron can easily be an innovation, entailing e.g. the deactivation of the Iterative Constituent Construction (ICC) grouping syllabic heads from left to right in the brackets-and-edges model of

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[7] Final (weak) *-æ* may be stressed only in words of two syllables, hence *fidǽ* 'father' vs. *ær-min-cǽɣdæ* 'play for me' (Testen 1997:727, quoting Isaev 1966:26–7). This complication will not be dealt with here in reconstructing the POss. accentual system.

Idsardi 1992 and Idsardi and Halle 1995. If Thordarson's description of Digor stress is correct, we may assume that this dialect preserves the POss. situation, whereby stress falls on the first strong vowel, otherwise on the final syllable. Such a system could also have developed into the accentual pattern given by Isaev: under the Halle and Idsardi model, the ICC would alter its parameter settings for bracket construction from LLL in POss. to LLR in Digor.

If the above reconstruction is accurate, the placement of stress in POss. is exactly analogous to that which operated in the prehistory of Sogdian, the only difference being in the specification of marked syllable heads: strong vowels in POss. vs. long vowels in Sogdian[8]. As we shall see below in §4, the contrast of strong and weak in Ossetic largely, though not entirely, continues the earlier PIran. distinction between long vowels and diphthongs vs. short vowels and makes it likely that the Rhythmic Rule was an innovation shared by (most of) Sogdian and pre-POss. The following section will examine the evidence for this stress placement in prehistoric processes affecting pre-POss. vocalism, e.g. syncope and umlaut, and its consequences for the relative chronology of these and other sound changes.

4 Stress and the Prehistory of Ossetic Vocalism

Before considering the prehistory of Ossetic vocalism in detail, let us first summarize the principal vowel correspondences from PIran. to POss. and the two dialects. These are provided in the table below:

PIran.	POss.	D	I
*aCC	*a	*a*	*a*
*aCV	*æ	*æ*	*æ*
*ā	*a	*a*	*a*
*i, *ī	*i	*i*	*y*
*u, *ū	*u	*u*	*y*
*ai	*e	*e*	*i*
*au	*o	*o*	*u*
(*āi, *āu)			

Thus, the six vowel phonemes reconstructible for POss. can be projected backwards to their most common PIran. sources. When this is done, one observes that, excepting only the rare instances of PIran. *ī and *ū and the lengthening of *a > *ā in closed syllables (or of *æ > *a, depending on the relative chronology; see below), the POss. "weak" vowels *æ, *i, *u descend from short PIran. *a, *i, *u, respectively, whereas "strong" POss. *a, *e, *o continue PIran. long *ā and the diphthongs *ai and *au. These relationships are diagrammed below:

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[8] The vowel alternations between *a* (or *o*) and *æ* do not directly reflect the placement of POss. accent (contra Thordarson 1990:259ff.), but are instead due to the contrast between open and closed syllables in (pre-)POss. (cf. Testen 1997:721fn.16).

	PIran.			POss.	
i		u	i		u
ai	a	au	e	æ	o
	ā			a	

Such agreement between those syllables which counted as long in Sogdian (for the most part, long vowels and diphthongs) and the sources of the "strong" vowels in Ossetic, suggests that these two related East Iranian languages may have developed . In order to test this hypothesis, however, we must place the stress shift in a relative chronology of sound changes in pre-POss., much as Sims-Williams has done for Sogdian (see §2). The relevant changes here will include umlaut, syncope, and other conditioned developments, as well as the outcome of word-final sequences (*Auslautgesetze*), which as is known from many other branches of Indo-European often deviate from their normal outcome in other positions.

Before turning to comparative and internal reconstruction, we must begin with the surviving evidence for medieval (pre-)Proto-Ossetic, which, though meager in the extreme, cannot be overlooked. We begin with the one epigraphic find discovered to date, the Zelencuk inscription of the western Caucasus. This has been dated to the 10th-12 c. AD by Zgusta 1987, whose excellent and thorough discussion of all previous treatments concludes with a summary and translation (pp. 59-61). I reproduce his edition of the text here with a transliteration into Roman characters:

ΣΑΧΗΡΗ ΦΟΥΡΤ ΧΟΒΣ	*Saxiri furt Xovs,*
ΗΣΤΟΡΗ ΦΟΥΡΤ ΠΑΚΑΘΑΡ	*Istori furt Bæqætar,*
ΠΑΚΑΘΑ(Ρ)Η ΦΟΥΡΤ ΑΝΠΑΛΑΝ	*Bæqætari furt Æmbalan,*
Α(Ν)ΠΑΛΑΝΗ ΦΟΥΡΤ ΛΑΚ	*Æmbalani furt Lag;*
ΑΝΗ ΤΖΗΡΘΕ	*ani čirtæ*[9].

'X. son of S., B. son of I., Ä. son of B., L. son of Æ.; (this is) their monument.'

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[9] Here and below I assume that pre-POss. at this stage still possessed palato-alveolar *č, *ǯ, *ǯ' for modern Oss. *c*, *ʒ*, *ʒ'* as in early 19th c. South Oss. dialects, preserved today after *n* and in geminates; Abaev 1949:496–7, Thordarson 1989:463).

Though mostly composed of proper names, this inscription contains several features worth noting. The gen. sg. ending is already *-i* (-H); it occurs four times before ΦOYPT 'son' to indicate the fathers of the four men buried at the site. That POss. *i and *u have not yet fallen together is shown by the spelling of ΦOYPT (*furt*): cf. D *-i*, *furt* vs. I *-y*, *fyrt*, in which POss. *i and *u have merged as *y*. Zgusta seems to imply that the language of the inscription is thus closer to Digor (1987:61), but as Digor is here (and in many other respects) merely more archaic than Iron, preservation of the distinction between -H and ΦOYPT is hardly surprising. Most important — and unexpected — is the preservation of -E < *-ah in TZHPΘE < PIran. *čiθra- (Avestan *čiθra-* 'visible sign, form', Khotanese *tcira-* 'image', Persian *čihra* 'face, figure, image') vs. mod. D, I *cyrt*. As I can imagine no other possible source for the writing of a final -E here, this spelling implies that the reflex of PIran. *-ah had not yet fallen by the time of the inscription[10].

We now turn to the other source for medieval Ossetic, two lines in the Byzantine court official Ioannis Tzetzes's Theogony (12th c.) in what he calls "Alanic". This text has been studied by several researchers, the most recent attempts being Bielmeier 1993 and Testen (1994:312-5). Below I give a transliteration of the two non-Greek lines of text in the edition of Hunger 1953, together with the reconstructed medieval (pre-P)Oss. and translation[11].

...tapagkhàs mésphili khsinà korthì kánta·...
tò phárnetz kíntzi mésphili kaìtz phouà saoûgge;

dæ ban x^{w}*arz, mæ sfili, (æ)xsīnæ,...*
du farniʒ, kinʒæ mæ-sfili, kajci fæwa sawgin?

'Good day to you (lit. 'your day be good'), my lord, lady,...
Are you ashamed, bride of my lord, who will have ('whose is to be')
a priest?'

In this text, as has long been observed, the characteristic Ossetic rounding of *a to *o before *n has not yet occurred: *tapagkhàs*, corresponding to modern D *dæ bon x*^{w}*arz*, I *dæ bon xorz* 'your day be good', contains an *a* in *ban*

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[10] Another possibility is that the reflex of *-ah had fallen some time before, but -E continued to be written by orthographic convention, exactly parallel to the retention of silent final -ъ in Russia (up to 1918) and Bulgaria (up to 1945).

[11] For syntactic objections to Bielmeier's (1993:16ff.) analysis of the second line, see Testen (1994:315fn.17).

(*pag*) 'good' vs. D, I *bon*[12]. As evidence for a "weak" or reduced value of the vowel reflecting final *-ah or *-ā, however, Tzetzes's text is of little value. The contrast between *khsinà* for *əxšijnə and *kíntzi* for *kinǯə (D *kinʒæ*, I *čynʒ*) is not reassuring, though the *i* of the latter may represent raising and fronting caused by the preceding palatal. Note also that the accent is not marked where it is predicted to fall in POss. — and actually attested in D *æxsī́næ, kinʒǽ*. Considering that Tzetzes may not have had complete command of the Alanic of his time, and that his purpose is only to render two lines of sample conversation, we would be wise to dismiss this evidence as less than fully reliable.

The medieval (pre-)POss. continuants of PIran. masc. a-stem nom. sg. *-ah and fem. *ā*-stem *-ā must have been distinct, since their reflexes differ in Digor: *-ah > D, I -Ø, whereas *-ā > I -Ø but D -*æ*, as shown below:

PIran.	POss.	Digor	Iron
*-ah	*-æ=*[-ə]?	-Ø	-Ø
*-ā	*-a?	-*æ*	-Ø

The final -E of Zelencuk TZHPΘE suggests that the POss. continuation of PIran. *-ah was some sort of front vowel (though it could of course very well stand for a phonetically reduced [ə]). Below I shall assume that PIran. *-ah > POss. *-i, based on the admittedly very slim evidence of nom. pl. PIran. *pitarah > *fidari —> *fidali-tā > POss. *fidal-ta > D *fidæltæ*, I *fydæltæ* (see 3b below).

Putting together the results of comparative reconstruction of POss. and PIran. and the sparse relics of earlier stages of Northeast Iranian, we obtain the following relative chronology of sound changes.

1) Voicing of PIran. *p, *t, *č, *k between vowels/sonorants.
This must have preceded the suffixation of coll. *-tā (2).

2) The generalization of originally collective *-tā (or *-ta < *-tā) as the plural suffix.
If this was suffixed to the nom. sg., the preforms for masc. (*a*-stems) and fem. (*ā*-stems) would have been *-ita and *-ata, respectively[13].

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[12] Cf. also *daban horz* in the word list from the Jász in Hungary, who were speaking a language very similar to Ossetic as late as 1422 (Bielmeier 1989a:242).

[13] It is perhaps worth considering the possibility that the ancient tribal names *Massagé-tai* and *Sarmá-tai* were plurals (with *-ta represented in Greek as -*tai*) to masc. *Masag-i and fem. *Sarm-a (or sim.), respectively.

3a) Final *-ah > *-i (?).

The only real evidence for positing high front *-i is the change of *r > *l in old r-stem relationship nouns, which appear to have added collective *-tā (or *-ta) to the old nom. pl. in *-ah: *pitarah > *pitari —> *pitari-ta > POss. *fidaltæ > D *fidaltæ*, I *fydaltæ* 'fathers'. Since *r otherwise becomes *l only before *i (and *ry > *l), these relic plural formations may attest to the initial development of PIran. *-ah > *-i before later weakening to *ə and eventual loss by the POss. stage. Cf. once again Zelenčuk TZHPΘE < PIran. *čiθra, though -E here could certainly stand for phonetic [ə].

3b) Shortening of final long vowels: *-ā > *-a

4) *ri > *li, *ry > *l

See 3a) above for evidence that final *-ah > *-i in *r*-stem pl. *pitarah > *fidari-ta > *fitali-ta > POss. *fidəl-ta > D *fidæltæ*, I *fydæltæ* 'fathers'. Similarly for D, I *madæltæ* 'mothers', *ærvadæltæ* 'brothers, relatives'. That this change had taken place already by early medieval times is confirmed by such well-known names as *Alanoí* 'Alans' < *aryān- (Bielmeier 1989a:241). The shift of *r > *l before *i, and presumably also *ry > *l, must precede the syncope of unstressed *i (7).

5) Umlaut effects: *a > *u / __ C_1u, *a > *i / __ C_1i, *u > *i / __ C_1i.

Examples are numerous:

*kanikā > *kainičá > POss. *kinʒá > D *kinʒæ*, I *čynʒ* 'bride, daughter-in-law';
*madu > POss. *mud > D *mud*, I *myd* 'honey';
*mušikā > *mišičá > *miščá > POss. *mistá > D *mistæ*, I *myst* 'mous(i)e' (dimin. to *muš- 'mouse');
*pasu > POss. *fus > D *fus*, I *fys* 'sheep';
*paš(m)ikā > *faiš(m)ičá > *faiščá > POss. *festá > D *festæ*, I *fist* 'spring wool' (dimin. to *pašman- > D *fans*, I *fasm* 'autumn wool');

The evidence of 'honey' and 'sheep' demonstrates that umlaut *must* have preceded the apocope of final short vowels; the other examples, in which PIran. *i causes umlaut before being lost, show that this change also must have taken place prior to the syncope of unstressed (word-internal) short vowels[14].

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[14] An ordering before (2a) is extremely tenuous: if *-ah really did first develop to *-i, this probably did not feed umlaut (though any umlaut effects on the stem vowel can have been undone by analogy to unaltered forms, e.g. in other cases).

6) STRESS SHIFT: stress shifts to the first heavy syllable, i.e. long vowel or diphthong, in the phonological word, otherwise to the final syllable.

7) Syncope of unstressed vowels in open syllables.

Cf. the examples of *i*-umlaut above in (1), e.g. *faiš(m)ičá > *faiščá, *kainičá > *kinʒá, *mišičá > *miščá. The same may account for masc. (*a*-stem) pl. *-ita > *-ta, although this could have been analogically remodelled after the sg. in POss.: masc. sg. *-ah > *-i > *-ə > POss. *-Ø —> pl. *-Ø-tə.

Similarly, syncope provides the only plausible account of the absence of *-æ- in the pl. of originally fem. (*ā*-stem) nouns in *-a > POss. *-æ, which one might expect to be *-ata > POss. "*-atæ" or analogical "*-æ-tæ". Since Digor always drops final *-æ* in the pl., e.g. in *bælasæ*, pl. *bælæs-tæ* 'tree(s)', x^{w}*æræ*, pl. x^{w}*ær-ttæ* 'sister(s)' (Miller 1903:16, 40-1), the POss. preform was most likely *-tæ.

Note, however, that examples such as *madya-ka- > *maidaka- > POss. *médæg > D *medæg*, I *midæg* 'within' demonstrate that at least some unstressed *æ (< PIran. *a) in medial open syllables was not lost. Further research will be required to determine the exact relationship between syncope and the placement of stress in pre-POss., in particular the exact conditions for syncope.

8) Unstressed *ya > *i.

In addition to the old case endings, there are two clear examples:

i) the preposed definite article *i < *ya (PIran. *ya-), e.g. in D *færǽt* 'ax' vs. *i fǽræt* 'the ax', I *færǽt* vs. *fǽræt* < *i fǽræt with synchronically morphologized stress shift;

ii) *eẓāfe*-construction with *i < *ya (also from PIran. *ya-), e.g. in D *mad-i zærond*, I *mad-y zærond* 'old mother', lit. 'mother-who (is) old' (Bailey 1946:205-6).

These chronological relationships can be represented in diagram 1 (boldface indicates sound changes not shared with Sogdian). The consequences of this ordered sequence of changes, of course, is that word-final *-ayā(h) in the fem. (*ā*-stem) gen./dat., loc., and inst.-abl. and masc. (*a*-stem) loc. develops to *-C-ayă (3b) > *-C-ya (7) > *-C-i (8), which became generalized as a new "oblique" marked by the ending *-i[15]. Even more noteworthy is the degree

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[15] Note that the relative chronology of sound changes (6)-(8) and the development of *θy > *cc* (e.g. in I *dyccæg* 'Tuesday' vs. D *dukkag*, I *dykkag* 'second', D *ærticcæg*, I *ærtyccæg* 'Wednesday' vs. D *ærtikkag*, I *ærtykkag* 'third', and in dever-

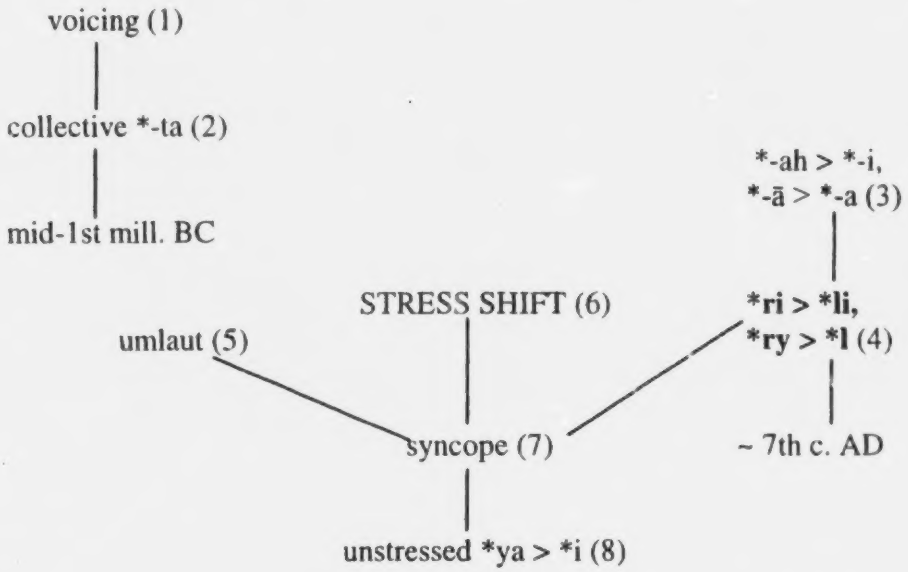

Diagram 1: Relative chronology of sound changes.

to which the changes reconstructed for the prehistory of Ossetic correspond with those posited by Sims-Williams and others for Sogdian. Though the change of *ri > *li, *ry > *l is particular to Alanic/Ossetic only, all the others are manifested in the historical phonology of Sogdian, even if not always in precisely the same form (cf. pre-Sogdian *-ya > *-ī, the third of Sims-Williams's rules for unstressed syllables; or the phonetic effects of *i*-umlaut[16]). This striking and unexpected correspondence in turn has repercussions for the prehistory and subgrouping of Ossetic and its East Iranian relatives.

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bal nouns in *-ccag* < *-θyāka-; Weber 1991) remains indeterminate: obl. *-cc-i < *-θya < *-taya to nouns in *-tə or *-ta can easily have been remodeled to *-t-i. The regular outcome of sequences of *Cy (*Ry > *RR, *Ty > TT; still productive in the modern language) is comparatively recent and almost certainly much later than the developments under consideration here.

[16] I have not yet encountered any mention of orthographic indication of *u*-umlaut in Sogdian, similar to that found in Ossetic 'honey' and 'sheep' (see above). The pre-Sogd. syncope of unstressed vowels *prior* to the Rhythmic Law (Sims-Williams 1989b:181) may have had parallels in pre-POss., but no positive evidence has yet come to my attention.

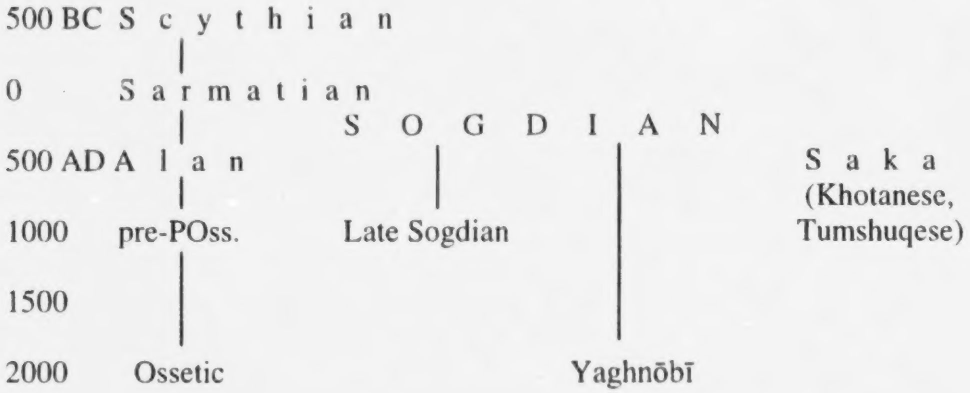
5 Implications for Subgrouping Within (North)East Iranian

As noted above, Bailey (1945, 1946) lists a number of lexical isoglosses which appear to connect the language of the "As", i.e. Ossetic, with the Middle East Iranian languages, in particular medieval Sogdian. These common vocabulary items are joined by at least one major morphological innovation: the formation of the pl. with the originally collective suffix *-tā, attested already in antiquity in the names of ancient Scythian and Sarmatian tribes living on the steppes to the north of Black Sea, e.g. *Massagé-tai* and *Sarmá-tai* (Bailey 1945:24-6; Sims-Williams 1989a:170).

Since we know that frequent migration was a salient characteristic of the peoples of the Eurasian steppe, the most logical framework in which to place the Northeast Iranian dialects of the 1st millennium BC and early centuries AD would be a dialect continuum, stretching from western Ukraine eastwards to what is now Chinese Turkestan. In addition to the Ossetic-Sogdian correspondences presented by Bailey, evidence for Northeast Iranian at the eastern end of the steppe comes from a set of Iranian loanwords in Tocharian which closely resemble Ossetic, e.g. TB *peret*, TA *porat* 'ax' < PT *p^{y}er^{y}etə, D, I *færæt*; TB *witsáko* < PT *w^{y}ẹt^{s}əko, D *yedagæ*, I *widag*. These can be dated to roughly the second half of the 1st millennium BC (see R. Kim 1999, §3.1-3 and the chart in §3.4) and reveal contact between speakers of pre-Proto-Tocharian and pre-POss. in eastern Central Asia during this period. Much later, the early medieval Alans, believed to be the (linguistic) ancestors of today's Ossetes, are found back on the western steppes and in the Balkans.

Within such an enormous geographical area, certain linguistic changes would have begun in one place and diffused to neighboring regions, but only rarely (if ever) spread across the entire steppe. The continuing accumulation of locally specific changes gradually differentiated this originally more homogeneous chain of NEIran. dialects into an early form of Ossetic (pre-POss.), the various, mostly unattested or indirectly recorded dialects of Sogdian, and far to the east in Xinjiang, the Saka languages, Khotanese and Tumshuqese. This naturally explains why Ossetic has more features in common with Sogdian than Saka: the latter most likely "branched off" and became relatively isolated from the rest of the NEIran. dialect continuum at an early date, while the more western regions remained in closer contact through migration and trade.

The account of POss. *-i offered here presupposes that the pre-POss. accent shift described above, and other related early changes affecting unstressed vowels (e.g. *-ya > *-i), were shared by neighboring (westerly) dialects of Sogdian, in which the accent shift is familiar as the Rhythmic Law and likewise leads to an obl. ending *-ī* in heavy-stem nouns. Notably, modern Yaghnōbī, the only living descendant of Sogdian, appears to descend from a dialect which never underwent the Rhythmic Law (Bielmeier 1989b:480, fn. 1 with refs.)[17]. This means that the pre-POss. accent shift covered most, but not all of the Osseto-Sogdian dialect area. Below is a schematic representation of Northeast Iranian dialects in the early centuries AD and their diachronic development:



The derivation of POss. obl. *-i from various Old Iranian nominal case endings in *-ayă as a result of an accentual generalization thus adds to the isoglosses already shared by Ossetic and Sogdian. That the ancestor of Yaghnōbī never underwent this same, typically Sogdian rule is a problem only if one adheres to a rigid *Stammbaum* model of East Iranian, or Iranian in general. The evidence listed above for a large-scale dialect continuum spanning the steppes of Eurasia underscores the inadequacy of such an approach in this case, and instead favors a wave-model approach to the innovations characterizing, and historical interrelationships among, the attested and surviving Northeast Iranian languages.

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[17] The generalization of obl. -*ī* to all nouns must therefore have followed a different path from that observable in Late Sogdian (see §2 above).

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A Hierarchy of Phonetic Constraints on Palatality in Russian*

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In this paper I investigate factors responsible for neutralization of plain-palatalized contrasts, focusing on coronal and labial stops in Standard Russian. I argue that the full range of distributional facts characterizing these segments can be adequately characterized only if one derives neutralization from phonetic perceptual and articulatory factors (*Licensing by Cue*: Steriade 1997; also Flemming 1995, Hamilton 1996, Silverman 1997, among others). As it will be shown, some environments support the 'plain-palatalized' contrast better than others, while other contexts tend to neutralize it. Places of articulation differ in their neutralization patterns. I will demonstrate that whether the contrast licensed or neutralized, depends crucially on the availability of perceptual cues encoded in a certain environment. I will determine the relative importance of these cues and propose a fixed markedness hierarchy of context-sensitive constraints on plain-palatalized contrasts.

1 Distribution of Palatality Contrasts in Russian

1.1 Inventory and Palatalized Contrasts

The Russian consonant inventory is given in Table 1.[1] As we see, the language can be considered as fully representative of the typology of palatalization. The plain-palatalized phonemic distinction involves all places of articulation: labials, coronals and velars. Plain consonants may be velarized to some extent (Skalozub 1963, etc.).

In this paper I limit the discussion to the distribution of coronal and labial stops (highlighted in Table 1), disregarding their laryngeal distinction. I show these segments again in Table 2.

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[1] My assumptions concerning phonotactics and articulatory and acoustic phonetics of Russian are based on the following sources: Avanesov 1972, Bolla 1981, Bondarko 1977, Derkach 1975, Halle 1959, Jones & Ward 1969, Kuznetsova 1969, Lazova 1974, Matusevich 1976, and Skalozub 1963.

Labials		Coronals					Velars	
p	**pʲ**	**t**	**tʲ**				kʲ	k
b	bʲ	d	dʲ				[gʲ]	g
		ts			tʃʲ			
f	fʲ	s	sʲ	ʃ	ʃʲː		[xʲ]	x
v	vʲ	z	zʲ	ʒ				
m	mʲ	n	nʲ					
		l	lʲ					
		r	rʲ					
						j		

Table 1. Russian consonant inventory.

	Labial	Coronal
'Plain'	p	t
Palatalized	pʲ	tʲ

Table 2. Plain and palatalized labial and coronal stops.

1.2 Distribution of Plain and Palatalized Stops

The distribution of plain and palatalized stops is summarized in Table 3.[2]

I consider single stops and these segments in two- and three-consonant clusters. Note that while the unmarked, plain segments occur in all of the contexts under consideration, their palatalized counterparts exhibit rather asymmetrical distributional patterns. What we see in Table 3, is that in some environments both palatalized labials and coronals are unrestricted (abcd), that is, fully contrastive. In other contexts they are restricted to a certain number of clusters. There is only one attested cluster with a final palatalized labial (e). Coronals have a limited number of clusters in other positions (fg). In still other positions the segments in question are completely neutralized in favour of the unmarked plain stops ((h) and (fg) for labials only). Interestingly, palatalized coronals enjoy a fuller contrastive potential than palatalized labials.

It is also worth emphasizing that some of these environments are subjects to additional constraints imposed by the nature of the following consonant. In the preconsonantal positions (fgh) coronals may be tolerated only if

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[2] See Kochetov (to appear) for details.

the following segment is of a different place of articulation (Table 4). There are also some restrictions before front vowels (Kochetov 1998 (to appear)).

	Environment	Contrast C • C^j	
		Labial	Coronal
a.	V__V	yes	yes
b.	#__V	yes	yes
c.	C__V	yes	yes
d.	V__#	yes	yes
e.	C__#	yes/no (1)	yes/no (5)
f.	V__C[3]	no	yes/no (3)
g.	#__C	no	yes/no (1)
h.	C__C	no	no

Table 3. The distribution of plain and palatalized stops (Note: yes = unrestricted; yes/no = restricted, no = prohibited; (1) = the number of attested contrastive clusters).

		Labial	Coronal
a.	#__C_{htr}V	no	yes/no (1)
b.	V__C_{htr}(#)	no	yes/no (3)
c.	V__C_{hm}(#)	no	no

Table 4. Constraints on occurrence before hetero-organic (C_{htr}) and homorganic (C_{hm}) consonants.

In sum, not a single environment in Table 3 is free from some kind of constraint on palatalized stops. Several questions arise with regard to these data. Why are certain environments better for realization of the contrast than others? Why is the contrast tied up to the quality of the following consonant or vowel? How can we explain the distributional discrepancies between labials and coronals?

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[3] For simplicity I exclude the clusters with a palatalized C2. The summary of distribution of stops before palatalized consonants is given in Kochetov 1998 (to appear).

2 Licensing by Cue: Phonetic Cues to Palatalized Consonants

In order to account for these complex distribution patterns, I turn to the hypothesis of *Licensing by Cue*, developed in the works of Steriade 1997, 1998, as well as Flemming 1995, Hamilton 1996, and Silverman 1997. According to this approach, phonological contrasts are neutralized in environments poor in terms of phonetic cues and are preserved or licensed in positions that are high on a scale of perceptibility. This scale is based on relative number of cues, their relative duration and perceptual salience.

2.1 Cues to Palatalized Stops

I will begin with identifying cues to palatalized stops. I frame my analysis in the gestural representations developed in the framework of Articulatory Phonology (Browman & Goldstein 1989 and Zsiga 1997) and the auditory representations worked out in Flemming 1995.

A palatalized consonant is characterized as having a primary gesture (Lips or Tongue Tip) with a secondary palatal articulation superimposed onto it. Consider the gestural score of sequences $ap^{j}a$-$at^{j}a$ (1a). The secondary gesture (Tongue Body-palatal), which is acoustically characterized by high F2, overlaps with the gestures of the preceding and following vowels, resulting in formant transitions. The overlap is usually more apparent at the release than at the formation of the primary constriction (Ladefoged & Maddieson 1996: 364; Flemming 1995: 35).

This alignment of gestures provides the sequence of acoustic events in (1b): approach, closure, burst, and release. Of these four, approach (V-C formant transitions), release (C-V transitions), and burst of fricative noise are known to contain important information about the place of articulation of the stop (Flemming 1995: 33-37). It is crucial for our analysis to know what the relative importance, or perceptual salience of each of these cues is. Here I consider acoustic details of release, approach and burst. For simplicity I refer to them as cues. I do not discuss the properties of closure, since this component, having no acoustic energy, cannot differentiate stops.

A release after a palatalized consonant in Russian (Table 5) is characterized by a fairly long period (up to 35-40 per cent of the vowel[4]) with F2

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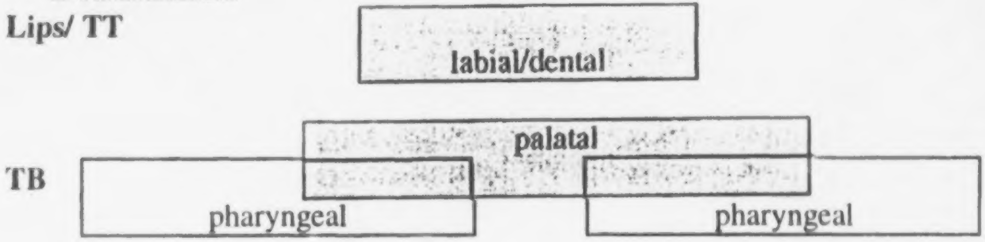
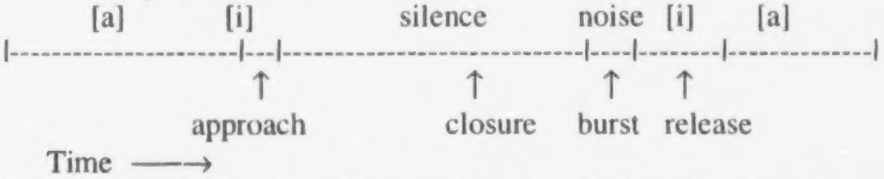
[4] Here the release includes the period of the vowel with F2 typical for front vowels [i] and [ɛ]; the duration of release may vary in different positions (Kuznetsova 1969: 73).

(1) Intervocalic: [apʲa] or [atʲa]:

a. Articulation:



b. Acoustic sequence of events:



(Note: TB = Tongue Body; TT = Tongue Tip; Constriction degree and gestures of Glottis and Velum are omitted).

gradually lowering. For example, the release of initial palatalized *tʲ* in *tʲatʲa* 'daddy' is 35 per cent of the vowel time (Kuznetsova 1969: 73). The duration of release is approximately the same for labials and coronals (Bondarko 1977: 95-100).

	F2	Duration
Cʲa	high → low	35-40%

Table 5. Release: C-V transitions.

Release is considered to be the main acoustic cue to palatalized consonants in general (e.g. Ladefoged & Maddieson 1996: 364, Derkach 1975). However, this is the case only if the following vowel has a lower F2, that is, there is a perceptible difference between the release and the nucleus of the vowel. For example, the difference in F2 between the beginning of the release (F2 = 1700 Hz) and F2 of the vowel [a] (F2 = 1200 Hz) is significant (500 Hz), while this difference may be minimal with the following front vowel (Bondarko 1977).

Unlike release, an approach to a palatalized stop is a much shorter period of 6-9% characterized by a lower F2 (Table 6). For example, the ap-

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proach to the intervocalic palatalized *tʲ* in *tʲatʲa* 'daddy' is 6% of the overall duration of the vowel. Approach tends to be slightly shorter for labials, accompanied by a still lower F2 (Bondarko 1977: 95-100; Kuznetsova 1969: 73, 78).

	F2	Duration
aCʲ	low → high	6-9%

Table 6. Approach: V-C transitions.

The values of burst in terms of fricative noise are given in Table 7 (based on Bolla 1981: 117-121; cf. Kuznetsova 1969 for *tʲ*)[5]. We can notice a significant acoustic difference between the labial and coronal stops. While the palatalized labial has a rather short period of fricative noise (12% of the overall duration of the consonant), the coronal stop with a secondary palatal articulation exhibits a very long (51%) high frequency strong, strident noise. This factor makes palatalized coronal stops similar to affricates.

	Burst quality		Duration
pʲ	[φʲç]	low frequency	12%
tʲ	[sʲç]	high frequency high intensity	51%

Table 7. Palatalized burst.

Notice that release and approach are measured in terms of how much of the vowel time they occupy. Thus, these components are present *only* if there is a following or preceding vowel correspondingly. Burst is also context-sensitive: it may occur before some consonants and may be inhibited before others. These factors relate the cues crucially to linear environments.

After considering the components of approach, burst, and release of a palatalized stop, we can propose an implicational hierarchy of salience, as in (2). The relative salience of the cues is based on their durational characteristics, as well as on acoustic salience of different phonetic properties (e.g. high intensity strident fricative noise) (Flemming 1995: 31). The implication in

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[5] The values for burst are average. Burst tends to be longer before unstressed vowels, as well we in final and preconsonantal positions (Kochetov 1999; cf. Kuznetsova 1969: 105).

(2a) holds that release, constitutes the most important cue to a palatalized stop, followed by burst, while approach is the least important in cueing the segment. (2b) states an important place of articulation difference: the coronal burst is more salient than the labial burst.

(2) a. Release » Burst » Approach
b. Coronal Burst » Labial Burst

Having established the cues to palatalized stops and their relative salience, we will take a closer look at three different sets of cues present in certain environments and we will see whether these sets correlate with preserving or neutralization of the contrast between plain and palatalized stops.

2.1.1 All Cues: Intervocalic

The presence of all cues to palatality (release, burst, and approach) makes the intervocalic environment ideal for realization of the contrast (3).

(3) *Environment:* V__V
Cues: release, burst, approach
Input: ap^{j}a at^{j}a
Output: ap^{j}a at^{j}a

As we would expect, Russian palatalized labials and coronals are fully contrastive in this environment, as we see in (4).

We may reasonably expect that with the removal of any of the three significant cues to a palatalized stop the perception of the segment will deteriorate, and thus, it will be more likely to be neutralized in a given environment.

(4)	a.	ko[p]at'[6]	'dig'	o[p^j]at'	'again'
		sa[p]og	'high boot'	sa[p^j]ër	'combat engineer'
		lo[p]ux	'burdock'	ku[p^j]ura	'banknote'

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[6] Here and below I use the transliteration adopted in North American literature on Russian, while using the IPA symbols for transcription. ë = fronted [o] (C^j__) , y = [ɨ], C' = [C^j].

b.	va[t]a	'cotton'	ba[t^j]a	'dad'
	po[t]ok	'stream'	po[t^j]ok	'began to flow'
	pe[t]ux	'rooster'	u[t^j]ug	'iron'

2.1.2 No Release: Preconsonantal (__C$_{htr}$)

Let's consider the result of removing one of the cues, a release of a palatalized stop, while retaining burst and approach. We will look at the medial preconsonantal environment. Taking into account the fact that in Russian stops retain their burst when followed by another hetero-organic consonants, especially, by stops and nasals (Jones and Ward 1969: 89, 105; cf. Zsiga 1998), we will consider only hetero-organic clusters. In sequences *ap^{j}ka-at^{j}ka* (5) the most important cue, release, is missing. The two other components, burst and approach, are still present.

(5)	*Environment:*	V__C$_{htr}$	
	Cues:	burst, approach	
	Input:	ap^{j}ka	at^{j}ka
	Output:	apka	at^{j}ka

How does the loss of the most important cue affect the distribution of the contrast? As we see from (6a), palatalized labials are completely disallowed in this environment. As for coronals (6b), we find here a few sequences, all of which are hetero-morphemic clusters. Palatalized coronals are prohibited in clusters within morphemes.

Similar patterns are also manifested in alternations in (7). While adding a hetero-organic suffix depalatalizes labials, it does not necessarily affect coronals.

(6)	a.	šlë[pn]ut'	'to slap'	*-[p^{j}n]-	
		le[pt]a	'mite'	*-[p^{j}t]-	
		to[pk]a	'furnace'	*-[p^{j}k]-	
	b.	po[dm]oga	'help'	ve[d^{j}m]a	'witch'
		o[tp]ast'	'to fall off'	su[d^{j}b]a	'fate'
		re[tk]o	'rarely'	re[t^{j}k]a	'radish'

(7)	a.	golu[pʲ]	‘pigeon’	golu[pk]a	‘female pigeon’
		ce[pʲ]	‘chain’	ce[pn]oj	‘chain’, adj.
	b.	ba[tʲ]a	‘dad’	ba[tʲk]a	‘dad’, familiar
		xo[dʲ]it’	‘to walk’	xo[dʲb]a	‘walking’

Table 8 summarizes the distribution of labials and coronals in the absence of release providing the number of attested clusters with plain and palatalized stops, as well as the number of contrastive clusters (in parenthesis).

V__C_{htr}V	Labial	Coronal
Clusters with C	9	4
Clusters with Cʲ	0	3
Contrasts C • Cʲ	no	yes/no (3)

Table 8. Labial and coronal stops before hetero-organic consonants.

2.1.3 No Release, No Burst: Preconsonantal (__C_{hm})

Let's consider environments that lack both release and burst, which possess the two most salient cue sets. Here we look at positions before homorganic consonants or a lateral, since stops in Russian do not have their independent burst when followed by these segments (Jones and Ward 1969: 89, 105). The sequences *apʲma-atʲna* (8) are different from those in (5) only in the quality of following segment: it is a consonant of the same primary place of articulation as the palatalized stop (either labial or coronal). The only cues available here are those of the approach, the least important cueing component.

The result of this poorly cued combination of gestures is a complete neutralization of both palatalized labials (9a) and coronals (9b).

(8)	*Environment:*	V__C_{hm}	
	Cues:	approach	
	Input:	apʲma	atʲna
	Output:	apma	atna

(9)	a.	o[bm]an	'deception'	*-[b^jm]-
		ca[pf]a	'pin'	*-[p^jf]-
	b.	e[tn]os	'ethnos'	*-[t^jn]-
		o[tl]ožit'	'to put off'	*-[t^jl]-
		o[tt]orgnut'	'to tear away'	*-[t^jt]-
		o[ts]adit'	'to displant'	*-[t^js]-
		o[tʃ]el'nik	'hermit'	*-[t^jʃ]-
		o[tts]epit'	'to unhook'	*-[t^jts]-

This is also evident in the synchronic depalatalization in (10). For example, the nasal plosion in *pu*[tn]*yj* or lateral plosion in *ko*[tl]*y*, or the following fricative in *my*[ts]*a* do not allow for an independent burst, and lead to neutralization of the underlying palatalized coronal.

(10)	pu[t^j]	'way'	pu[tn]yj	'worthwhile'
	my[t^j]	'to wash'	my[ts]a	'to wash oneself'
	ko[t^j]ël	'boiler', sg.	ko[tl]y	'boiler', pl.
	o[t^j]ec	'father'	o[ts:]a	'father', gen.sg.

I summarize the outcome caused by the absence of two most salient cue sets in Table 9: palatalized stops are never found here.

V__C$_{hm}$	Labial	Coronal
Clusters with C	2	7
Clusters with C^j	0	0
Contrast C • C^j	no	no

Table 9. Labial and coronal stops before homorganic consonants.

As we can see in (11) only the sequences that allow for a burst constitute a set of well-formed clusters: *t^jp*, *t^jk*, *t^jm*, and *t^jf* (11a). Those that are not characterized by burst result in ungrammatical sequences (11b).

(11)	a.	t^jp, t^jk, t^jm, t^jf	Burst: yes
	b.	*t^jt, *t^js, *t^jʃ, *t^jn, *t^jl, *t^jts	Burst: no

Summing up the facts reviewed here, the presence of all cues to palatality results in the most contrastive context. An absence of release leads to neutralization of palatalized labials. And the absence of burst is the factor that triggers neutralization of palatalized coronals. Having no approach does not affect palatalized stops to the same degree as having no release or burst.

2.2 Word Edges

It should be noted that segments at word edges may benefit from more acoustic cues in connected speech than segments in word-internal clusters (Hamilton 1996: 235). Thus a word-initial consonant following a vowel-final word receives additional approach cues (12a), and a word-final consonant preceding a vowel-initial word is supplied with release cues (12b) correspondingly. On the other hand, segments in internal clusters are not affected and thus are at a disadvantage. Thus, we are to expect systematic distributional asymmetries between these contexts.

(12) a. vo t'mu -[ʌtʲm]- ‘in the dark'
additional approach
b. golub' uletel -[upʲu]- ‘a pigeon flew away'
additional release

2.3 Summary

Let's now summarize how the available phonetic cues determine whether palatality in Russian is preserved or neutralized. In Table 10 I show sets of cues (a through k) that differ in perceptual salience and can be found in the corresponding linear environments.

Comparing the sets of cues and environments with the corresponding neutralization patterns reveals the fact that licensing of a plain-palatalized contrast depends crucially on the cues. Having at least two high salient cues, those of release and burst, results in a fully licensed plain-palatalized contrast (abc). Burst and approach with an optional release are sufficient to support the distinction (d). However, removing approach from this set causes minor restrictions, more apparent with labials: there is only one contrastive

	Cues			Environment	Contrast C • C^j	
	release »	burst »	approach		Labial	Coronal
a.	√	√	√	V__V	yes	yes
b.	√	√	(√)	#__V	yes	yes
c.	√	√		C__V	yes	yes
d.	(√)	√	√	V__#	yes	yes
e.	(√)	√		C__#	yes/no (1)	yes/no (5)
f.		√	√	V__C_{htr}	no	yes/no (3)
g.		√	(√)	#__C_{htr}	no	yes/no (1)
h.		√		C__C_{htr}	no	no
i.			√	V__C_{hm}	no	no
j.			(√)	#__C_{hm}	no	no
k.				C__C_{hm}	no	no

Table 10. Cues provided by environments and distribution of plain and palatalized stops (Note: (√) = the cue is optionally provided in connected speech; (1) = one contrastive cluster is attested).

cluster (e). Having no release is 'deadly' for labials; coronals still survive, provided two other components are present (fg). Only burst (h) or only approach (i, j) do not constitute a sufficient cueing environment. Even more so, no contextual cues (k) will inevitably lead to non-recoverability of the contrast by a listener. The discrepancies between the places of articulation follow from the hierarchy of salience (2), repeated in (13).

(13) a. Release » Burst » Approach
b. Coronal Burst » Labial Burst

In short, all the characteristic constraints on distribution of palatalized stops are derivable from phonetic information manifested in acoustic cues.[7]

We can formalize these results in the following way. We recast the hierarchy of cued environments given in (13) into a perceptibility scale, or fixed ranking of constraints (cf. Steriade 1997, Boersma 1997). These constraints, illustrated in (14), require neutralization of palatality in different environments. The constraints on gesture combinations that result in fewer cues are ranked higher, and those with more cues are lower.

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[7] See Kochetov 1998 (to appear) on the neutralization before front vowels.

(14) *PAL/V__V: Neutralize palatality contrast between vowels.
*PAL/#__V: Neutralize palatality contrast word-initially (in the absence of the preceding vowel).
*PAL/V__#: Neutralize palatality contrast word-finally (in the absence of the following vowel), etc.

The faithfulness constraint to palatalized consonants, PRESPAL (15), can be ranked against the fixed hierarchy, determining a language-specific pattern of neutralization, or a threshold of perceptibility of the contrast. Preserving the contrast in a less cued environment implies maintaining it in a more informative context. (16) illustrates the distributional patterns attested in Russian. Some other possible cross-linguistic patterns based on different rankings of PRESPAL against the same hierarchy are shown in Appendix.

(15) PRESPAL: Preserve a plain-palatalized contrast.

(16)	Constraint hierarchy		Cues
	Labials	*Coronals*	
neutralize	*PAL/C__C		*fewer cues*
	*PAL/#__C		
	*PAL/V__C	*PAL/C__C	
PRESPAL ---------------	----------------------------	----------------	⇓
	*PAL/C__#	*PAL/#__C	
	*PAL/V__#	*PAL/V__C	
	*PAL/C__V	*PAL/C__#	
preserve	*PAL/#__V	*PAL/V__#	
	*PAL/V__V	*PAL/C__V	
		*PAL/#__V	
		*PAL/V__V	*more cues*

This hierarchy can be further refined if we consider factors that affect perception of palatalized consonants: the quality of the following or preceding consonant (hetero-organic vs. homorganic; sonorant vs. obstruent) and vowel (back vs. front), stress, etc. These factors form sub-hierarchies within the constraints in (16). They differ in their relative importance and may interact with each other allowing for certain trade-offs.

It is important that this hierarchy of constraints is not a devised stipulation, but a result of the presence or absence of phonetic cues provided by the environments.

3 Conclusion

The presented analysis of neutralization of plain-palatalized contrasts in stops is based on the phonetic and phonotactic facts of Russian. The account provides evidence for the hypothesis of *Licensing by Cue*, demonstrating that palatalized stops can be licensed or neutralized depending on availability of phonetic auditory information, and, particularly, the contextual cues of release, burst, and approach, and their relative salience. Further, differences between places of articulation are based on acoustic properties of burst and approach. The distribution of these cues in linear environments results in a perceptibility scale that can be modeled as a fixed hierarchy of contextual constraints on the palatality contrast. Finally, the account provides additional support for the view that phonotactics make reference to phonetic information available in contextual cues and that phonetics plays an important role in determining environments for the neutralization of phonological contrasts.

Appendix

Type	Language	V_V	#_V	V_#	V_C	C_C
A	???	yes	yes	yes	yes	yes
B	Russian Mordva Scots Gaelic	yes	yes	yes	yes	NO
C	Irish Manx	yes	yes	yes	NO	NO
D	Bulgarian Lithuanian Nenets	yes	yes	NO	NO	NO
E	Karelian Saami	yes	NO	NO	NO	NO

Table 1. A typology of palatalized contrast: coronal stops (from Kochetov 1998 (to appear).

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Japanese Floating Classifiers

William McClure

Japanese is well known for a phenomenon referred to as floating quantifiers and exemplified in (1). The grammatical sentences here all mean "Taroo bought three books."

(1) "Taroo bought three books"
  a. *Taroo-ga* ***hon san.satu-o*** *katta*
    -NOM book 3.volume-ACC bought

  a' **Taroo-ga* ***hon san.biki-o*** *katta*
    book 3.animals-ACC

  b. *Taroo-ga* ***hon-o san.satu*** *katta*

  c. *Taroo-ga* ***san.satu hon-o*** *katta*

In (1a), the head noun *hon*, and the number-classifier complex *san.satu* form a single unit which receives accusative case. There is agreement between the head noun and the classifying expression, and an expression such as *hon san.biki* "book 3.animals" in (a') is ungrammatical. (1b) illustrates the basic phenomena of the floating quantifier where the classifying expression occurs to the right of the case-marker. In (1c) we see that the classifier may precede the noun as well.

Kitahara's (1993) analysis for the sentences in (1) is shown in (2). Note that the order in (1b) is actually basic. In all three structures, the noun and its classifying expression are generated in what Kitahara calls an NCP which is selected by a DP. In (2a), the head noun moves first to the Spec of the NCP to check agreement with the classifier, and then to Spec of DP for case, giving us the *hon-o san.satu* order. In (2b), the nominal head once again moves to check agreement, but then the entire NCP raises to the Spec of DP giving us the *hon san.satu-o* order. Finally, in (2c), the NCP scrambles out of the DP to give the preposed *san.satu hon-o* order.

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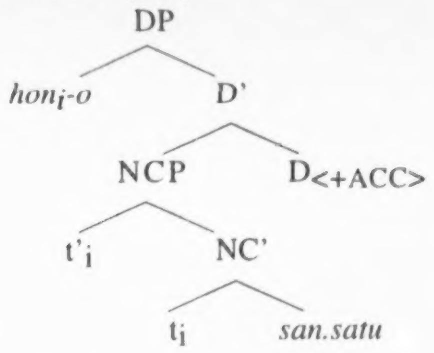
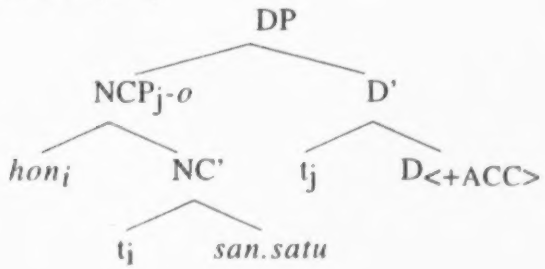
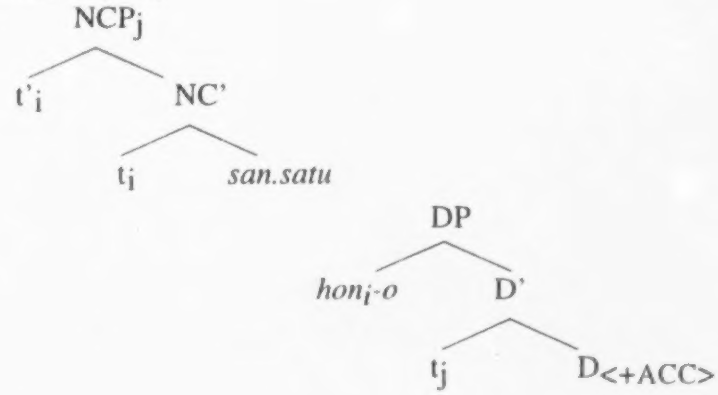
(2) a. *hon-o san.satu* (=1b)


DP
hon$_i$-o
D'
NCP
D<+ACC>
t'$_i$
NC'
t$_i$
san.satu

b. *hon san.satu-o* (=1a)


DP
NCP$_j$-o
D'
hon$_i$
NC'
t$_j$
D<+ACC>
t$_i$
san.satu

c. *san.satu ....hon-o* (=1c)


NCP$_j$
t'$_i$
NC'
t$_i$
san.satu
DP
hon$_i$-o
D'
t$_j$
D<+ACC>

The structures here are consistent with independent tests which show that the expressions *hon-o san.satu* and *hon san.satu* in (2a&b) are constitu-ents (DPs) while the *san.satu hon-o* order in (2c) is not. Kitahara's constitu-ency tests are given in (3) and (4). These are both taken from Kamio (1983).

(3) Conjunction (Kamio 1983)
"Taroo bought three books and three pens"
a. *Taroo-ga hon-o san.satu-to pen-o san.bon katta*
-NOM book-ACC 3.volumes-and pen-ACC 3.cylinders bought

b. *Taroo-ga hon san.satu-to pen san.bon-o katta*
-NOM book 3-volumes-and pen 3.cylinders -ACC bought

c. **Taroo-ga san.satu hon-to san.bon pen-o katta*
-NOM 3.volumes book-and 3.cylinders pen-ACC bought

(4) Pseudo-cleft (Kamio 1983)
"It is three books that Taroo bought"
a. *Taroo-ga katta-no-wa hon-o san.satu da*
-NOM bought-COMP-TOP book-ACC 3.volumes COPULA

b. *Taroo-ga katta-no-wa hon san.satu-o da*
-NOM bought-COMP-TOP book 3.volumes-ACC COPULA

c. **Taroo-ga katta-no-wa san.satu hon-o da*
-NOM bought-COMP-TOP 3.volumes book-ACC COPULA

Kitahara's analysis can also be extended to the examples in (5a&b) adapted from Fukushima (1991, 1993) which show that the range of classifier movement is wider than found in Kitahara's original paper.

(5) "Taroo bought three books at Kinokuniya"
a. ***San.satu*** *Taroo-ga* ***hon-o*** *Kinokuniya-de katta*
3.volumes -NOM book-ACC -at bought

b. *Taroo-ga* ***hon-o*** *Kinokuniya-de* ***san.satu*** *katta*
-NOM book-ACC -at 3.volumes bought

b' T-ga [$_{VP}$ **hon$_j$-o** [$_{VP}$ K$_i$-de [$_{VP}$ **san.satu** [$_{VP}$ t_i t_j katta]]]]

In (5a), the classifier is scrambled to the very front of the sentence. (5b) is more involved, but if we combine Kitahara's analysis with Hoji's (1985) view of clause structure and scrambling, (5b) would have the complete structure of (5b'). The original order of elements in the VP is adjunct, object, verb. First the classifier scrambles, followed by the adjunct and then the direct object.

Nevertheless, there are two potential problems for Kitahara. First, subject construal of nouns and their classifiers in (6) is almost as free as for object, and only the order in (6e) where the object intervenes between the subject and its classifier is ungrammatical. This is easily explained if we follow Saito (1985) and assume that subjects do not scramble. A possible analysis of (6e) is found in (6e'), but this is not available if subjects do not scramble. Under such an assumption, however, the grammatical (6d) should also be impossible because the analysis in (6d') also entails subject scrambling.

(6) Subject construal
"Three students bought a book at Kinokuniya"
a. ***Gakusei san.nin-ga*** *Kinokuniya-de hon-o katta*
student 3.people -NOM -at book-ACC bought

b. ***San.nin gakusei-ga*** *Kinokuniya-de hon-o katta*

c. ***Gakusei-ga san.nin*** *Kinokuniya-de hon-o katta*

d. ***Gakusei-ga*** *Kinokuniya-de* ***san.nin*** *hon-o katta*

d' [$_S$ **Gakusei$_i$-ga** [$_S$ K$_j$-de [$_S$ **san.nin** [t_i t_j hon-o katta]

e. ****Gakusei-ga*** *Kinokuniya-de hon-o* ***san.nin*** *katta*

e' [$_S$ **Gakusei$_i$-ga** [$_S$ K$_j$-de [$_S$ hon$_k$-o [$_S$ **san.nin** [t_i t_j t_k katta]

A more general problem is raised by the fact that classifiers do not float out of adjunct expressions at all (Inoue 1978). *Mise san.ken-de* in (7a) means "at three stores," but other arrangements of the adjunct noun and its classifier are ungrammatical as we see in (7b) where it follows the particle; in (7c) where it follows the direct object; and in (7d) where it precedes the noun.

(7) "at three stores"
a. ***Mise san.ken****-de hon-o katta*
store 3-building-at book-ACC bought
"I bought a book at three stores"

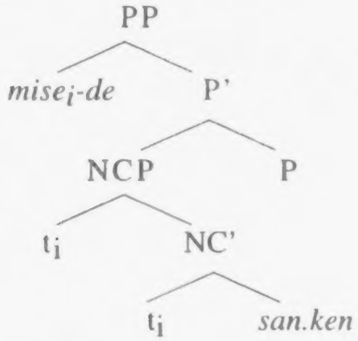
b. ****Mise-de san.ken*** *hon-o katta*

c. ****Mise-de*** *hon-o* ***san.ken*** *katta*

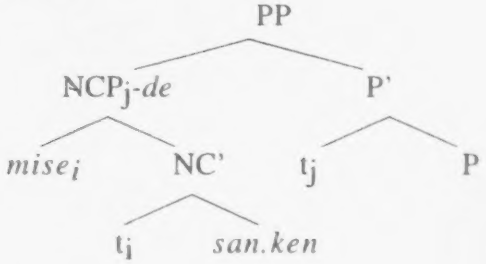
d. ****San.ken mise-de*** *hon-o katta*

It is not unreasonable to assume that the basic structure of *mise san.ken* is the same as *hon san.satu*. Both are NCPs, and the same agreement requirement exists between head noun and classifier. Given that the adjunct expression is selected by a PP rather than a DP, the structures in (8) parallel Kitahara's structures for *hon san.satu* in (2) above. What remains unclear is why only (8b) is grammatical.

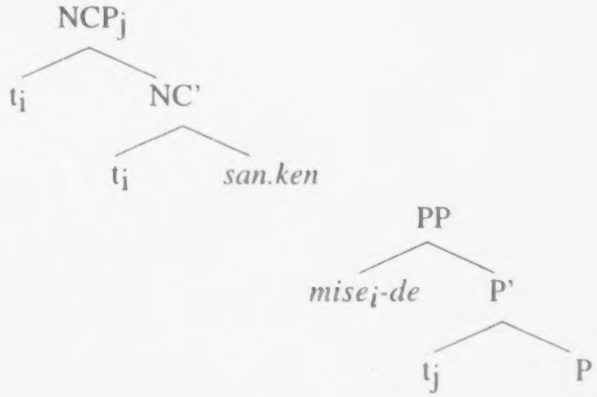
(8) a. **mise san.ken*


PP
mise$_i$-de
P'
NCP
P
t$_i$
NC'
t$_i$
san.ken

b. *mise san.ken-de*


PP
NCP$_j$-de
P'
mise$_i$
NC'
t$_j$
P
t$_i$
san.ken

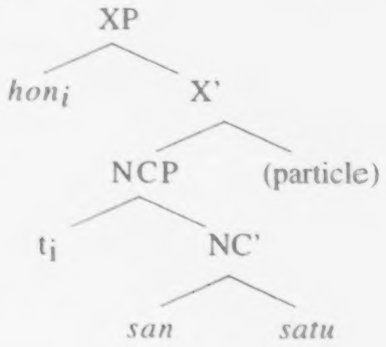
c. **san.ken ....mise-de*


NCP$_j$
t$_i$
NC'
t$_i$
san.ken
PP
mise$_i$-de
P'
t$_j$
P

In contrast to Kitahara, Fukushima (1991, 1993) treats classifying expressions as freely generated adverbs. Such an analysis better captures the distribution of classifying expressions which is basically unrestricted (at least for argument expressions), but a different set of facts remains unexplained. First, Fukushima assumes that agreement between the head noun and the classifier is subject only to a pragmatic constraint (Fukushima 1993:218), which I take to mean that it is more or less accidental and may under the right circumstances be violated. I do not believe this to be true. Certainly, the agreement can never be violated. Second, Fukushima distinguishes formally between subject, object, and adjunct classifiers. While it is true that the distribution of classifiers construed to subjects is different from that of classifiers construed to direct objects, the classifying expressions themselves are identical and interchangeable. Given identity of form, it is not clear why they should have as many as three different semantic interpretations, and it is not clear how a classifier "knows" which interpretation is the right one. In the analysis which I offer, the subject/object/adjunct differences fall out from assumptions about the basic syntax and semantics of the entire sentence. Finally, Fukushima, makes little attempt to integrate the facts of scrambling with the phenomena of classifier float, and the sentences in (1), (5), and (6) would all be base-generated with no use of scrambling.

I begin my discussion with the syntax and semantics of Japanese case-marking. Let us say that all nominal elements in Japanese have the syntax in (9).

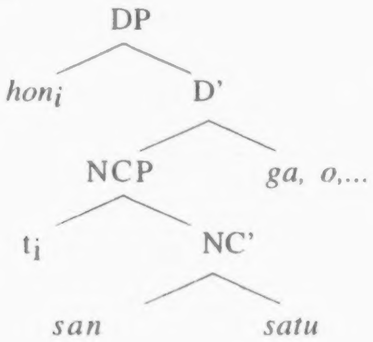
(9) Nominal syntax
hon san.satu
book 3.volumes
"three books"



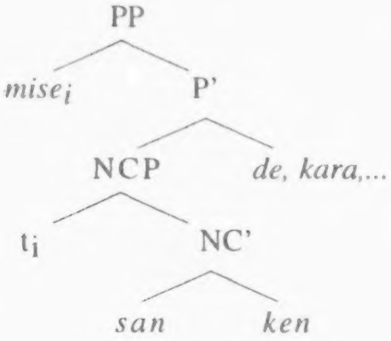
This is a head-final version of Abney's (1987) DP structure which includes a measure phrase for expressions such as *the many choices* or *a few good men* or *those six tigers*. So as not to confuse the issue, I have followed Kitahara in labeling this measure phrase NCP.

As Kitahara proposes, agreement between the NP and its classifier is determined inside the NCP by Head-Spec agreement. The head noun moves to the Spec of the XP for case. The identity of XP itself depends on the particle. Arguments (*ga, o*, sometimes *ni*) head DP as in (10a), while adjuncts (*de, kara*, etc.) head PP as in (10b). The DP structure at least is identical to one proposed by Tateishi (1989) who assumes that case particles are found in the head of D. The structure for PP is an obvious extrapolation.

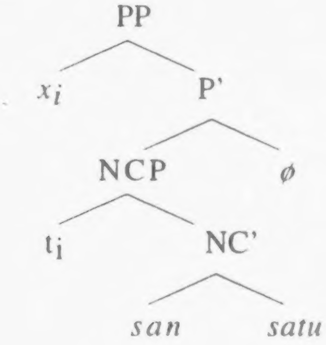
(10) a. Argument



b. Adjunct



c. Adverbial



Like Fukushima, I assume that floated QPs are base-generated adverbs. I further assume that they are predicated of a variable *x*, and that they are selected by an adverbial PP with an empty head as in (10c). Classifiers are but one type of adverb, however, and other such expressions are headed by overt an particle such as *ni* or *to* as well.

I would argue that the syntax in (10) is in some sense maximally simple, capturing the fact that all nominal phrases in Japanese have the same basic syntax (noun-classifier-particle). Agreement between the noun and classifier is checked in the same way in all of these structures. Contra Kitahara, I do not allow the NCP to scramble because it is not clear to me why the NCP can scramble out of a DP in (10a) while it cannot scramble out of a PP in (10b). Rather, the differences between these various expressions will be found in the semantic content of the X-head (D or P). The question I must answer is how agreement is checked between a particular noun and the classifier in an adverbial PP in (10c), given that there is no formal syntactic link between them.

Adopting the event semantics of Kratzer (1996) (where external arguments are introduced separately and all predicates are in some sense intransitive), I propose that the accusative case marker *o* has the semantics in (11a) so that the expression *hon-o* has the semantics in (11b).

(11) a. $\mathbf{o}^* = \lambda x \lambda Q \lambda e[Q(x)(e)]$

b. $(\mathbf{hon\text{-}o})^* = \lambda Q \lambda e[Q(\text{book})(e)]$

Of course, the structure in (10a) actually puts the classifying expression at the bottom of the tree. I will take the view that a classifier such as *san.satu* has the semantics in (12).

(12) **(san.satu)*** = $\lambda x[(\text{volume})(x) \text{ and } |x| = 3]$

(12) means simple that there is a noun which is an instance of a *volume* and that the number of these instances is three. Under this view, simple nouns in Japanese are all treated as entities (contra Krifka (1995) as well as someone like Chierchia (1997) who would treat all nouns in a language like Japanese as kinds). It is also worth mentioning that while Japanese does not distinguish between mass and count nouns in the manner of English, the two noun types are clearly distinguishable. Japanese classifiers are traditionally divided into one of two types: *instances* and *containers*. *Satu* "volume" is an example of an instance. *Hai* "cup" is an example of a container. Instances correspond basically to the English notion of count noun while containers measure mass nouns (Miki Suzuki, personal communication). The derivation of *hon san.satu-o kau* is given in (13).

(13) *hon san.satu-o kau* "buy three books" (= 10a)

a. **(san.satu)*** = $\lambda x[(\text{volume})(x) \;\&\; |x|=3]$

b. **o*** = $\lambda x \lambda Q \lambda e[Q(x)(e)]$

c. **(san.satu-o)*** =
$\lambda x \lambda Q \lambda e[Q(x)(e) \;\&\; (\text{volume})(x) \;\&\; |x|=3]$
by Variable Identification
(cf. Event Identification in Kratzer 1996)

d. **hon*** = book

e. **(hon san.satu-o)*** =
$\lambda Q \lambda e[Q(\text{book})(e) \;\&\; (\text{volume})(\text{book}) \;\&\; |\text{book}|=3]$
by Functional Application

f. **(kau)*** = $\lambda x \lambda e[\text{buy}(x)(e)]$

g. **(hon san.satu-o kau)*** =
$\lambda e[\text{buy}(\text{book})(e) \;\&\; (\text{volume})(\text{book}) \;\&\; |\text{book}|=3]$
by Functional Application

(14) Event Identification (Kratzer 1996)

$$\begin{array}{cccc} f & g & & h \\ \langle e, \langle s, t\rangle\rangle & \langle s,t\rangle & \rightarrow & \langle e, \langle s, t\rangle\rangle \\ \lambda x \lambda e & \lambda e & & \lambda x \lambda e \end{array}$$

The structure in the last line of (13) is exactly what we might expect an event semantic representation of the predicate to look like. It says that there is an event of buying one or more books, that books are categorized as *volumes*, and that the number of books is three. What Fukushima calls the pragmatics of the agreement between the noun and classifier is captured formally in line (13c). According to Kratzer's Event Identification (shown in (14)), two discrete elements may conjoin if their event arguments are identical. While Kratzer speculates that other kinds of conjunction might be possible, I would propose that two elements may conjoin as long as the variables of one element are a subset of the other. In (13a), we have an expression λx. In (13b) we have an expression $\lambda x \lambda Q \lambda e$. The two expressions will conjoin in (13c) if and only if the two x's are identical. This of course forces the variable x to be an argument of the verb and to be an argument of the right physical type. It is this requirement which gives us agreement. The rest of the derivation is straightforward Functional Application.

The semantic derivation of an adjunct such as *mise san.ken de hon-o kau* "buy a book at three stores" is found in (15). The semantics of the particle *de* is given in line (15b), with Variable Identification allowing for the structure in (15c). Comparing (13) and (15), however, a difference does emerge in line (e). Specifically, the predicate in (13e) must be unsaturated, while the predicate in (15e) must be saturated (i.e. is the first argument Q(x)(e) or Q(e)?). This difference forces the verb in (15) to combine with the direct object before it combines with the adjunct expression. The semantics of the adjunct expression gives us a result which is consistent with Hoji's claim that adjuncts are generated above direct objects.

(15) *mise san.ken-de hon-o kau* "buy a book at three stores" (= 10b)

a. **(san.ken)*** = $\lambda x[(\text{building})(x)\ \&\ |x|=3]$

b. **de***= $\lambda x \lambda Q \lambda e[Q(e)\ \&\ \text{at}(e)=x]$

c. **(san.ken-de)*** =
$\lambda x \lambda Q \lambda e[Q(e)\ \&\ \text{at}(e)=x\ \&\ (\text{building})(x)\ \&\ |x|=3]$
by Variable Identification

d. **mise*** = store

e. **(mise san.ken-de)*** =
$\lambda Q \lambda e[Q(e)\ \&\ \text{at}(e)=\text{store}\ \&\ (\text{building})(\text{store})\ \&\ |\text{store}|=3]$
by Functional Application

f. **(kau)*** = $\lambda x \lambda e[\text{buy}(x)(e)]$

g. (**hon-o kau**)* = $\lambda e[\mathrm{buy}(\mathrm{book})(e)]$
by Functional Application

h. (**mise san.ken-de hon-o kau**)* =
$\lambda e[\mathrm{buy}(\mathrm{book})(e)\ \&\ \mathrm{at}(e){=}\mathrm{store}\ \&\ (\mathrm{building})(\mathrm{store})\ \&\ |\mathrm{store}|{=}3]$
by Functional Application

Note further that if we assume that an adjunct is basically a predicate of events, any number of adjuncts can combine with a saturated predicate by the process of Variable Identification.

(16) *Mokuyoobi-ni mise san.ken-de hon-o kau*
"buy a book at three stores on Thursday"

a. (**mokuyoobi-ni**)* = $\lambda Q\lambda e[Q(e)\ \&\ \mathrm{on.Thursday}\ (e)]$

b. (**mise san.ken-de hon-o kau**)* =
$\lambda e[\mathrm{buy}(\mathrm{book})(e)\ \&\ \mathrm{at}(e){=}\mathrm{store}\ \&\ (\mathrm{building})(\mathrm{store})\ \&\ |\mathrm{store}|{=}3]$

c. (**mokuyoobi-ni mise san.ken-de hon-o kau**)* =
$\lambda e[\mathrm{buy}(\mathrm{book})(e)\ \&\ \mathrm{at}(e){=}\mathrm{store}\ \&\ (\mathrm{building})(\mathrm{store})\ \&\ |\mathrm{store}|{=}3]$
$\&\ \mathrm{on.Thursday}\ (e)]$
by Functional Application

I turn now to the adverbial expression in (10c). The semantics for the empty adverbial head is found in line (b) of (17).

(17) *hon-o san.satu kau* "buy three books" (= 10c)

a. (**san.satu**)* = $\lambda x[(\mathrm{volume})(x)\ \&\ |x|{=}3]$

b. **ø*** = $\lambda Q\lambda x\lambda e[Q(x)(e)]$

c. (**san.satu-ø**)* = $\lambda Q\lambda x\lambda e[Q(x)(e)\ \&\ (\mathrm{volume})(x)\ \&\ |x|{=}3]$
by Variable Identification

d. (**kau**)* = $\lambda x\lambda e[\mathrm{buy}(x)(e)]$

e. (**san.satu-ø kau**)* =
$\lambda x\lambda e[\mathrm{buy}(x)(e)\ \&\ (\mathrm{volume})(x)\ \&\ |x| = 3]$
by Functional Application

f. (**o**)* = $\lambda x\lambda Q\lambda e[Q(x)(e)]$

g. **[hon-o)*** =
$\lambda Q \lambda e[Q(\text{book})(e)]$
by Functional Application

h. **(hon-o san.satu-ø kau)*** =
$\lambda e[\text{buy}(\text{book})(e) \;\&\; (\text{volume})(\text{book}) \;\&\; |\text{book}| = 3]$
by Functional Application

In line (c), the empty head combines with the classifying expression by Variable Identification. This combines with the verb in line (e). The fact that the same variable is an argument of the verb and an argument of the classifying expression in line (e) is what forces the eventual agreement between the noun and the classifier. Variable Identification and the resulting semantic structure forces surface agreement before the argument has actually been inserted. If this agreement is not realized, the final derivation in line (h) will be ill-formed because of an agreement mismatch.

Crucially, of course, the analysis in (17) will not work with an adjunct expression as we see in (18) and (19). While PP-internal classifiers may be interpreted, floated classifiers cannot be construed with PP-internal nouns.

(18) **mise-de san.ken hon-o kau* "buy a book at three stores"
a. **(hon-o kau)*** = $\lambda e[\text{buy}(\text{book})(e)]$

b. **(san.ken-ø)*** =
$\lambda Q \lambda x \lambda e[Q(x)(e) \;\&\; (\text{building})(x) \;\&\; |x| = 3]$

× c. **(san.ken-ø hon-o kau)*** = ??
Functional Application type mismatch

The derivation in (18) results in a type mismatch because the adverbial VP cannot combine directly with the verb and direct object combination. In contrast, (19) is semantically correct, but only if it means "buy three books which are buildings at the store." The agreement mismatch makes the sentence ungrammatical.

(19) **mise-de hon-o san.ken kau*
a. **(san.ken-ø)*** =
$\lambda Q \lambda x \lambda e[Q(x)(e) \;\&\; (\text{building})(x) \;\&\; |x| = 3]$

b. **(san.ken-ø kau)*** =
$\lambda x \lambda e[\text{buy}(x)(e) \;\&\; (\text{building})(x) \;\&\; |x| = 3]$

c. $(\textbf{hon-o})^* = \lambda Q\lambda e[Q(\text{book})(e)]$

× d. $(\textbf{hon-o san.ken kau})^* =$
$\lambda e[\text{buy}(\text{book})(e) \;\&\; (\text{building})(\text{book}) \;\&\; |\text{book}| = 3]$
Agreement mismatch

This is the basic account. I turn now to a couple of other facts associated with floating classifiers. First, the analysis is consistent with the observation that a fronted classifier has moved there by scrambling (which is to say, after it has been semantically interpreted (Saito 1989)). As we see in (20), direct semantic interpretation of the expression is not possible and (20c) is simply uninterpretable. (This is basically what went wrong in (18) as well.)

(20) *san.satu hon-o kau* "buy three books"
a. $(\textbf{hon-o kau})^* = \lambda e[\text{buy}(\text{book})(e)]$

b. $(\textbf{san.satu-}\boldsymbol{\emptyset})^* = \lambda Q\lambda x\lambda e[Q(x)(e) \;\&\; (\text{volume})(x) \;\&\; |x| = 3]$

× c. $(\textbf{san.satu-}\boldsymbol{\emptyset}\ \textbf{hon-o kau})^* = ??$
Functional Application type mismatch

Second, why is it that a subject classifier may not be found between the direct object and the verb (in (6e))? Recall that Fukushima excludes this possibility by giving separate semantic interpretations to subject and object classifiers.

(21) **Gakusei-ga hon-o san.nin katta*
student-NOM book-ACC 3.people bought
"three students bought a book"
a. $(\textbf{san.nin})^* = \lambda y[(\text{person})(y) \;\&\; |y|=3]$

b. $\boldsymbol{\emptyset}^* = \lambda Q\lambda y\lambda e[Q(y)(e)]$

c. $(\textbf{san.nin-}\boldsymbol{\emptyset})^* = \lambda Q\lambda y\lambda e[Q(y)(e) \;\&\; (\text{person})(y) \;\&\; |y|=3]$
by Variable Identification

d. $(\textbf{kau})^* = \lambda x\lambda e[\text{buy}(x)(e)]$

× e. $(\textbf{san.nin-}\boldsymbol{\emptyset}\ \textbf{kau})^* = \lambda y\lambda e[\text{buy}(y)(e) \;\&\; (\text{person})(y) \;\&\; |y|=3]$
Agreement mismatch

× e' $(\textbf{san.nin-}\boldsymbol{\emptyset}\ \textbf{kau})^* = \lambda y\lambda x\lambda e[\text{buy}(x)(e) \;\&\; (\text{person})(y) \;\&\; |y|=3]$

(20e) is derived by Functional Application (and not by Variable Identification). However, the resulting sentence forces the classifier *san.nin* to agree with the direct object and not with the subject. Semantically, the interpretation is fine but it does not mean what the sentence means, and there will be an agreement mismatch as soon as the direct object is inserted (since a *hon* is not an instance of a *person*). What we want is something like (20e') with both a variable x and a variable y, but this cannot be produced with the semantic tools we are using.

In short, the analysis depends crucially on the fact that an adverbial classifying expression is a predicate of individuals (and not of events). It can combine with a verb only when the argument of the adverbial and the argument of the verb are identical. This contrast is made explicit in (22).

(22) a. *stab x in the back*
λxλe[stab(x)(e) & in.the.back(e)]

b. *buy three x's*
λxλe[buy(x)(e) & (classifier)(x) & |x|=3]

In Neo-Davidsonian Event Semantics (cf. Parsons 1990), adverbial expressions are generally treated as predicates of events, as in (22a). In contrast, I am proposing that some adverbs are predicates of individuals as in (22b). It is this difference which explains why only argument classifiers may be realized as adverbials (and to "float way" from their head nouns). The principle of Event Identification which allows the two elements in (22a) to combine (because of a common event argument) is generalized to Variable Identification for both (22a & b). Two elements may combine if the variables in one are a subset of the variables in the other, and formally, there is no difference between basing conjunction on the identity of a variable e (in 22a) or a variable x (in 22b). In (22b) agreement between the adverb and the verbal argument is triggered not by a particular structural relationship (which is to say not by syntax), but because the adverb and the verb are both predicated of the same individual. In syntax, they may actually be quite far apart. In Japanese specifically then, it is possible to argue that all NPs have a single syntactic structure and that the differences in their behavior are located in the combinatorial properties of the X-head (D or P). Such an analysis can also be shown to be consistent with generally held views of Japanese word order and scrambling facts.

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A-Scrambling Exists!

Martha McGinnis

1 Preliminaries

The nature of scrambling is a focus of recent debate in the syntactic literature. The term *scrambling* is used to describe apparently optional permutations of word order, found especially in languages with extensive case-marking. Saito (1989) argues that scrambling is A-bar movement (like *wh*-movement), rather than A-movement (like movement to the subject position). Webelhuth (1989) argues for scrambling to positions with mixed A- and A-bar properties, while Mahajan (1990) counters that local (clause-internal) scrambling can be either to an A- or an A-bar position, while long-distance scrambling is A-bar movement.

In a recently published paper, Frank, Lee & Rambow (FLR; 1996) take a careful look at different types of evidence for the kind of movement involved in scrambling in German and Korean. They conclude that there is no A-scrambling, and that scrambling is actually a special kind of A-bar movement that can affect binding relations in some languages. However, there is good reason to reconsider the evidence against A-scrambling, and to maintain the strong hypothesis that there are only (at most) three types of syntactic movement—A-, A-bar, and head movement.

The central argument to be presented here is based on examples like the Georgian ones below. Suppose that local scrambling can be A-movement, as Mahajan (1990) suggests. Like other types of A-movement, local scrambling can create new binding relations. Thus, although the unscrambled object in (1a) cannot bind a possessive anaphor embedded in the subject, the scrambled object in (1b) can. On the other hand, some binding relations cannot be created by scrambling. For example, the subject anaphor in (2) cannot be bound by either an unscrambled object (2a) or a scrambled one (2b).

(1) a.?? *Tavisi*$_i$ deida [**nino-s**$_i$ xaTav-s].
self's aunt.NOM N.-DAT draw-PRES
'*Her*$_i$ aunt is drawing **Nino**$_i$.'
b. **Nino-s**$_i$ *tavisi*$_i$ deida [*t* xaTav-s].
'(same as (1a))'
(2) a. * *Tavisi tav-i*$_i$ [**vano-s**$_i$ xaTav-s].
self.NOM V.-DAT draw-PRES
'*Himself*$_i$ is drawing **Vano**$_i$.'
b. * **Vano-s**$_i$ *tavisi tav-i*$_i$ [*t* xaTav-s].
'(same as (1b))' (Léa Nash, p.c.)

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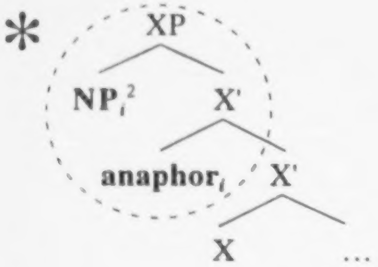
One possible interpretation of the contrast above is that the scrambled argument is not in an A-position, but rather in a position from which it can bind some anaphors and not others. However, there is reason to believe that the contrast between (1) and (2) falls under the broader generalization in (3), which affects all types of A-movement (McGinnis 1998). If so, the failure of binding in (2b) cannot be taken as evidence against A-scrambling.[1]

(3) An anaphoric dependency cannot be established between two specifiers of the same head.



2 Local Scrambling Can Be A-Movement

Prima facie evidence that scrambling can be A-movement is that, in some languages, it can create new binding relations, a property characteristic of A-movement. As a basis for comparison, consider A-movement to the subject position in Albanian (Massey 1990, 1992). In the active voice, the dative indirect object of a double object construction c-commands the accusative direct object. Thus an indirect object quantifier can bind a pronominal possessor embedded in the direct object (4a), but a direct object quantifier cannot bind a pronominal possessor embedded in the indirect object (4b).[3]

(4) a. Agimi ia dha [*secilit djalë* [**pagën e tij** t_V]].
A.NOM CL give each boy.DAT pay.ACC his
'Agim gave (to) *each boy(x)* **his(x) pay**.'
b. * Agimi ia ktheu [*autorit të tij* [**secilin liber** t_V]].
A.NOM CL return author.DAT its each book.ACC
'Agim returned (to) *its(x)* author **each book(x)**.'

---

[1] There is also a positive argument for A-scrambling, not given here, namely that a well-defined subclass of local scrambling behaves like A-movement for the purposes of relativized minimality (McGinnis 1998).

[2] Subscript indices are used to indicate anaphor-binding dependencies.

[3] These binding asymmetries hold regardless of word order; although a lower DP can scramble to an A-bar position above a higher one, such movement in (4b) (or (5b)) would only create a Weak Crossover violation.

In the passive, however, the binding asymmetry is reversed: the direct object, now bearing nominative case, raises to the subject position, from which it can bind a pronoun embedded in the indirect object (5a). Conversely, an indirect object quantifier cannot bind a pronoun embedded in the raised direct object.

(5) a. **Secili libër** iu kthye [*autorit të tij* [**t** t_V]].
each book.NOM CL returned.NACT author.DAT its
'**Each book(x)** was returned (to) *its(x)* author.'
b. * **Paga i tij** iu dha [*secilit djalë* [**t** t_V]].
pay.NOM his CL gave.NACT each boy.DAT
'**His(x) pay** was given (to) *each boy(x)*.'

Similar effects arise for anaphor binding. For example, an argument embedded in an infinitival clause in English cannot bind an anaphor in the higher clause (6a). However, if the embedded argument raises to the subject position of the higher clause, an anaphor-binding relation can be created (6b).

(6) a. * There seemed to *themselves*$_i$ [t to be **many people**$_i$ in trouble].
b. **Many people**$_i$ seemed to *themselves*$_i$ [**t** to be in trouble].

By contrast, A-bar movement does not create new binding relations.[4] (7) and (8) illustrate the familar Strong and Weak Crossover effects, respectively. In English, an object operator cannot bind a subject variable, either from its base position or from an A-bar position c-commanding the variable. Thus, neither the object *wh*-operator *which girl* in (7a) nor the object quantifier *some girl* in (7b) can bind the subject variable *she*. Likewise, an object operator cannot bind a pronominal variable embedded in the subject, as shown in (8).

(7) a. * **Which girl(x)** [does *she(x)* [like **t**]?
b. * *She(x)* likes **some girl(x)**.
(8) a.?? **Which girl(x)** [did *her(x)* friend [call **t**]?
b.?? *Her(x)* friend called **some girl(x)**.

Like A-movement, and unlike A-bar movement, scrambling can create new binding relations. (9) shows a transitive clause in Korean with an object *wh*-operator and a pronominal variable embedded in the subject (FLR 1996).

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[4] However, A-bar movement can repair Condition C violations. For example, *Which claim that John made was he willing to discuss?* allows coreference between *John* and *he*, unlike *He was willing to discuss the claim that John made* (Freidin 1986).

(9a) is a normal transitive sentence, in which the subject is in an A-position c-commanding the object. In this case, the operator-variable binding dependency is ill-formed. In (9b), however, the object falls to the left of the subject, and the binding dependency is fine. This suggests that the object in (9b) has scrambled to an A-position c-commanding the subject.

(9) a. * [*pro* chinkwu]-ka [**nwukwu-lul** paypanhayss-ni].
friend-NOM who-ACC betrayed-Q
'**Who*(x)*** did *his(x)* friend betray?'
b. **Nwukwu-lul** [*pro* chinkwu]-ka [*t* paypanhayss-ni].
'(same as (9a))'

A similar contrast can be seen in the double-object construction in (10), in which the direct object is a quantificational operator, and the indirect object contains a pronominal variable. Again, suppose that in (10a), the indirect object is in an A-position c-commanding the direct object; thus the operator cannot bind the variable. When the direct object falls to the left of the indirect object, the binding dependency is well-formed (10b), suggesting that the direct object has scrambled to an A-position c-commanding the indirect object.[5]

(10) a. * Kim pancang-i [*pro* iwus]-eykey [**nwukwuna-lul** sokayhayssta].
K. d.c.-NOM neighbor-DAT everyone-ACC introduced-Q
'District chair Kim introduced **everyone*(x)*** to *his(x)* neighbor.'
b. Kim pancang-i **nwukwuna-lul** [*pro* iwus]-eykey [*t* sokayhayssta].
'(same as (10a))'

In addition to operator-variable binding dependencies, anaphor-binding dependencies can be created via A-scrambling. This possibility is illustrated by the Georgian examples in (1), repeated below. In (1a), the object cannot bind the reflexive anaphor *tavis* embedded in the subject, since the subject is in an A-position c-commanding the object. In (1b), where the object precedes the subject, it can bind the anaphor, suggesting that it has scrambled an A-position c-commanding the subject.

(1) a.?? *Tavisi*$_i$ deida [**nino-s**$_i$ xaTav-s].
self's aunt.NOM N.-DAT draw-PRES
'*Her*$_i$ aunt is drawing **Nino**$_i$.'
b. **Nino-s**$_i$ *tavisi*$_i$ deida [*t* xaTav-s].
'(same as (1a))'

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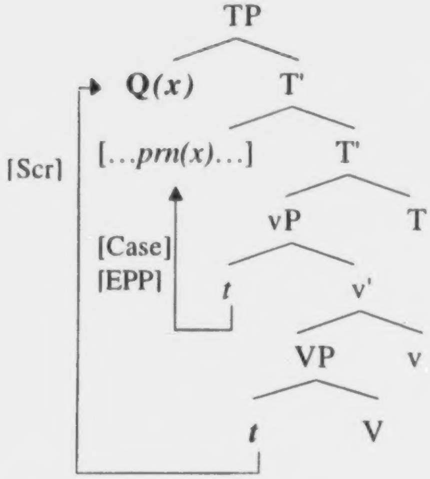
[5] An alternative possibility is that the direct object is base-generated in an A-position c-commanding the indirect object in (9b). There is evidence against this possibility in Japanese (see Takano 1996, Yatsushiro 1997).

Locality assumptions constrain the possible derivation of sentences involving A-scrambling. For example, consider the version of locality proposed in Chomsky (1995), where movement to the specifier of a head H occurs via feature-attraction by H. Locality is built into the definition of Attract: essentially, for each feature F of a head H, H attracts the closest element containing a feature of the right type to check F. Suppose that there are (at most) three types of features, corresponding to Rizzi's (1990) A-, A-bar and head dependencies, and that A-dependencies are created by attraction of nominal features (D, N or phi-features). Under this view, A-movement of the object past the subject can be represented as in (11).

(11)



[=derivation of (9b)]

In (11), the syntactic subject moves to the first specifier of TP, to check the Case/EPP features of T.[6] The object then scrambles into a second (higher) specifier of TP. Assuming that the subject leaves a copy or trace in a VP- (here, vP-) internal position, this trace has no features that could satisfy T, so it does not block attraction of the object. Once the subject is in a specifier of TP, no locality violation arises if T attracts the object as well. I assume that in languages allowing scrambling to spec-TP, T can be inserted into the derivation with an extra Scrambling or EPP feature, which attracts nominal features.[7] Note that, to move to an A-position c-commanding the subject, the object must move into the maximal projection occupied by the subject (here,

---

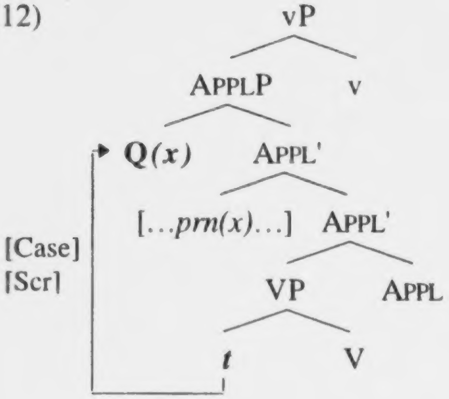
[6] The (first) EPP feature of T ensures that a sentence has a syntactic subject, in conformity with the Extended Projection Principle (a version of the familiar rule S→NP VP).

[7] It may be that a scrambled object is obliged to check Case in spec-TP as well (Miyagawa 1997), since normally an argument cannot undergo A-movement after checking Case.

TP). Under the relativized locality condition on Attract, the head of a higher maximal projection could not attract the object past the intervening subject.

The derivation of (10b), in which a direct object A-scrambles over an indirect object, can be represented as in (12). Suppose that this double-object construction has a VP-shell structure, in which the indirect object is base-generated above the direct object and below the external argument, in the specifier of a light "applicative" verb (Marantz 1993). If the direct object can scramble over the indirect object, it moves to a second specifier of APPLP.

(12)



[=partial derivation of (10b)]

If we assume the version of locality in Chomsky (1995), scrambling past one A-position to a higher A-position must involve a multiple-specifier derivation like (11) or (12). Even making this restrictive assumption, however, it is possible to capture the fact that scrambling can create new binding relations: a scrambled argument can move to an A-position where it c-commands another A-position that it did not c-command before movement.

3 Restrictions on Binding by Scrambled Arguments

As observed above, scrambled arguments are subject to certain binding restrictions. For example, although scrambling the (dative) indirect object over the (accusative) direct object can create a well-formed operator-variable binding relation in German (13), it cannot create the anaphor (reciprocal) binding relation in (14b) (Webelhuth 1989, FLR 1996).

(13) a. * daß der Jörg [*seinen* Vater] [**jedem** gezeigt hat]
that the J.-NOM his father-ACC each-DAT shown has
'that Jörg has shown *his(x)* father to **everyone(*x*)**.'
b. daß der Jörg **jedem** [*seinen* Vater] [*t* gezeigt hat]
'(same as (13a))'

The indirect object in German cannot bind a reciprocal direct object regardless of word order (14a-b). On the other hand, the direct object can bind a reciprocal indirect object (14c), suggesting that the direct object is base-generated in this c-commanding position.[8]

(14) a. * Gestern habe ich *einander*$_i$ [**den Gästen**$_i$ vorgestellt].
yesterday have I each other-ACC the guests-DAT introduced
'Yesterday, I introduced the guests to each other.'
b. * Gestern habe ich **den Gästen**$_i$ *einander*$_i$ [*t* vorgestellt].
'(same as (14a))'
c. Gestern habe ich *die Gäste*$_i$ [**einander**$_i$ vorgestellt].
yesterday have I the guests-ACC each other-DAT introduced
'(same as (14a))'

The contrast between (13) and (14) is by no means an isolated case. A similar contrast arises when an object scrambles over the subject, and can be observed in a wide range of scrambling languages, including Hindi, Japanese, and Georgian. What are we to make of this observation? One possibility would be to take the view that there is no A-scrambling, at least in these languages. For example, FLR (1996) propose that scrambling is an intermediate type of movement, non-operator A-bar movement, which can create new quantifier-pronoun binding relations but not necessarily anaphor binding relations. Since in some cases a scrambled argument can bind an anaphor, they suggest that binding principle A is parameterized: in some languages, an (overt) anaphor can be bound only from an A-position; in others, from any non-operator (A- or A-bar) position (15).

(15)

	A-mvt.	operator A-bar mvt.	non-operator A-bar mvt.
Q-pronoun binding	√	*	√
anaphor binding	√	*	parameterized

However, cross-linguistic evidence suggests a different explanation of the contrast between (13) and (14). First of all, a similar contrast can be observed within a given language, using only examples with anaphor binding. Moreover, the binding restrictions that arise in scrambling also arise under movement to subject position. I will argue below that the key to the contrast actually lies in the structural position of the bound element. The bound pronoun is embedded in the direct object (13b), while the reciprocal is the direct object itself (14b).

---

[8] Other base-generated c-command relations (e.g., subject-object) also allow reciprocal binding in German. However, focus interpretations may provide evidence that the indirect object is actually base-generated above the direct object (Hotze Rullmann, p.c.). I leave this issue for further investigation

4 Anaphor Binding Contrasts Within a Language

In a language with possessive anaphors, a contrast can be observed in the anaphor binding possibilities arising under A-scrambling. As already noted, for example, scrambling the object over the subject in Georgian makes it possible for the object to bind a possessive reflexive anaphor embedded in the subject (1b). On the other hand, although there are nominative (object) anaphors in Georgian, a scrambled object cannot bind a reflexive subject (2b).

(1) b. **Nino-s**$_i$ *tavisi*$_i$ deida [*t* xaTav-s].
N.-DAT self's aunt.NOM draw-PRES
'*Her*$_i$ aunt is drawing **Nino**$_i$.'
(2) b. * **Vano-s**$_i$ *tavisi tav-i*$_i$ [*t* xaTav-s].
N.-DAT self.NOM draw-PRES
'*Himself*$_i$ is drawing **Vano**$_i$.'

A similar contrast can be seen in Japanese (Miyagawa 1997, Yatsushiro 1997), which also has nominative anaphors. (16a) shows the object unscrambled, thus unable to bind a possessive anaphor in the subject DP. A clause-internally scrambled object can bind the reciprocal *otagai* embedded in the subject (16b), but not a reciprocal subject (16c). Likewise, for Hindi speakers allowing a nonsubject binder for *apne*, a clause-internally scrambled object can bind the possessive anaphor embedded within the subject (17b), but not a subject anaphor (17c) (Mahajan 1990 and Rajesh Bhatt, p.c.).

(16) a. * [*otagai*$_i$-no sensei-ga] [[**John-to Mary**]-**o**$_i$ mita].
each other-GEN teacher-NOM J.-and M.-ACC saw
(lit.) '*Each other*'s teachers saw **John and Mary**.'
b. [**John-to Mary**]-**o**$_i$ [*otagai*$_i$-no sensei-ga] [*t* mita].
'(same as (16a))'
c. * [**John-to Mary**]-**o**$_i$ *otagai*$_i$-ga [*t* mita].
J.-and M.-ACC each other-NOM saw
(lit.) '*Each other* saw **John and Mary**.'
(17) a. * [apne$_i$ baccoN-ne] [**mohan-ko**$_i$ ghar se nikaal diyaa].
self's children-ERG M.-ACC house from throw give.PERF
'*His*$_i$ children threw **Mohan**$_i$ out of the house.'
b. ? **mohan-ko**$_i$ [apne$_i$ baccoN-ne] [*t* ghar se nikaal diyaa].
'(same as (17a))'

c. * **raam-ko**$_i$ apne-aap-ne$_i$ [*t* maraa].
R.-ACC self-ERG beat.PERF
(lit.) '*Himself*$_i$ beat **Raam**$_i$.'

These observations support the view that the structural position of the bound element plays a key role in determining whether it can be bound by a scrambled argument. Under this view, the distinction between reciprocals and bound pronouns observed in German is incidental. Likewise, the ill-formed cases of anaphor binding cannot be attributed to a language parameter, since a scrambled argument can bind a possessive anaphor in the same language.

5 Binding Restrictions in Movement to Subject

There is additional cross-linguistic evidence to suggest that the binding restrictions that arise in scrambling also arise in movement to the subject position (Snyder 1992). For example, the subject of a passive or unaccusative verb cannot bind anaphoric (reflexive or reciprocal) *si* in Italian (Rizzi 1986). (18) shows the passive of a ditransitive clause in Italian. In (18a), the (dative) indirect object is a pronominal clitic, while the direct object *Gianni* raises to the subject position of the passive. This derivation is well-formed, unlike (18b), where the indirect object is a reflexive clitic. (18b) also contrasts with the well-formed (18c), where the indirect object is a nonclitic reflexive.

(18) a. **Gianni**$_i$ *gli*$_j$ è stato [*t* affidato].
G. him-DAT has been entrusted
'**Gianni**$_i$ has been entrusted to *him*$_j$.'
b. * **Gianni**$_i$ *si*$_i$ è stato [*t* affidato].
G. self has been entrusted
'**Gianni**$_i$ has been entrusted to *himself*$_i$.'
c. **Gianni**$_i$ è stato [*t* affidato [a *se stesso*$_i$]].
G. has been entrusted to himself
'**Gianni**$_i$ has been entrusted to *himself*$_i$.'

Rizzi points out that in (18b), the reflexive indirect object c-commands the base position of its would-be antecedent (indicated in bold), while in (18c), it is c-commanded by the base position of its antecedent.[9] The argument that moves to the subject position (*Gianni*) cannot bind the argument it moves over (*si*). This restriction is parallel to the binding restriction on scrambling: a scrambled argument cannot bind an argument it scrambles over—only an anaphor or a pronominal variable embedded within it.

---

[9] Most likely it is a trace in the base and/or Case positions of the reflexive clitic that c-commands the direct object in (18b). The clitic itself moves from its highest specifier position to adjoin to T^0 (McGinnis 1998), where it may not c-command the direct object.

Raising to the subject position also gives rise to a contrast between embedded and unembedded bindees (Massey 1990, 1992). Recall that in the Albanian passive, the direct object raises past the indirect object to the subject position. From this position, a raised direct object quantifier can bind a pronoun embedded in the indirect object (19a). However, the raised direct object cannot bind a reflexive indirect object (19b).

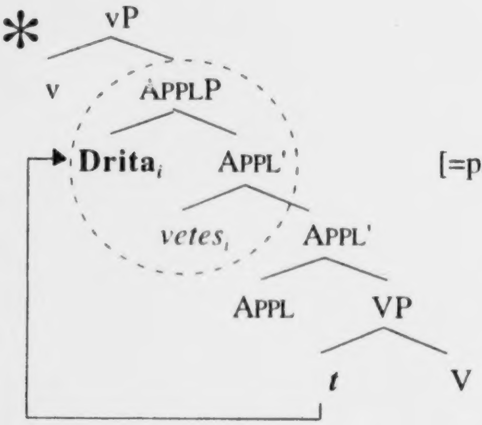
(19) a. **Secili djalë** iu tregua [*t* babës *të tij* [*t* t_V]].
each boy.NOM CL show.NACT father his.DAT
'**Each boy*(x)*** was shown to *his(x)* father.'
b. * **Drita**$_i$ iu tregua [*t* *vetes*$_i$ [*t* t_V]] prej artistit.
Drita.NOM CL show.NACT self.DAT by the.artist
'**Drita**$_i$ was shown to *herself*$_i$ by the artist.'

The contrast in (19) is an exact parallel to the contrast between embedded and unembedded bindees that appears under A-scrambling. This parallel can be captured if the binding restrictions on clause-internal scrambling are not specific to scrambling, but rather arise from a general constraint on binding and A-movement.

6 Lethal Ambiguity

As noted in section 2, the relativized locality condition on Attract constrains the possible derivations of a sentence in which a lower DP undergoes A-movement past a higher one. Such movement can only succeed if the lower DP moves into the maximal projection occupied by the higher one. Under this view, consider the derivation of the Albanian passive in (19b), part of which is shown in (20).

(20)



[=partial structure for (19b)]

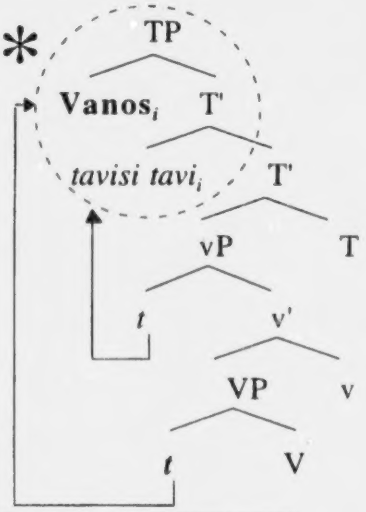
For the direct object (*Drita*) to raise past the indirect object (*vetes*) to the subject position, it must first move to the maximal projection where the indirect object is base-generated (APPLP). Once the direct object is in a specifier of APPLP, it is local enough to be attracted to spec-TP. However, because of the constraint in (3), no anaphoric dependency can be established between the two arguments (20). On the other hand, if an anaphor or bound pronoun is embedded *within* the indirect object, (3) is satisfied and the derivation is fine.[10]

(3) An anaphoric dependency cannot be established between two specifiers of the same head.

Similarly, if the object scrambles over the subject, it cannot bind the subject directly, since the two occupy specifiers of the same head. For example, the derivation of (2b) is schematized in (21).[11]

(2) b. * **Vano-s**$_i$ *tavisi tav-i*$_i$ [*t* xaTav-s].
N.-DAT self.NOM draw-PRES
'*Himself*$_i$ is drawing **Vano**$_i$.'

(21)



[=structure for (2b)]

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[10] An obvious question that arises is what allows the anaphor binding in (6b): *Many people seemed to themselves [*t *to be in trouble].* Possibly, as a PP, the *to*-phrase has no nominal features to be attracted by T. If so, the embedded subject can simply skip over this PP to the subject position.

[11] FLR report that in Korean, a subject anaphor *casin* can be bound by a scrambled object even when not embedded. Apparently, however, this interpretation is possible only when the binder is already a discourse topic (Yoonjung Kang, p.c.). It is possible that *casin* is actually bound by a discourse operator, which happens to corefer with the scrambled object. If so, a subject *casin* should be possible even if the object is unscrambled. I have not yet been able to test this prediction.

I have proposed that the derivations in (20) and (21) are ruled out by the constraint in (3)—but what gives rise to this constraint? Suppose that when the interpretive system is faced with an anaphor and an antecedent in specifiers of the same head, it cannot determine which one should receive the intended reference. An ambiguity (undecidability) arises between the two specifiers, and the derivation becomes uninterpretable. Alexiadou & Anagnostopoulou (1997) propose that a similar effect gives rise to the impossibility of leaving both the subject and the object in their vP-internal base positions. On the assumption that all heads raise covertly and adjoin to Comp, the Case features of v and T, if unchecked, become part of the same complex head at LF. In this configuration, the two Case features are equally eligible to attract the nominal features of the closest DP. An ambiguity arises between the two potential attractors, and the derivation crashes. Let us tentatively suppose that the same principle, Lethal Ambiguity, underlies both these effects and those of the constraint in (3).

Lethal Ambiguity also constrains the binding relations that can arise when one object scrambles over another. For example, if the direct object scrambles over the indirect object in Georgian, it can bind a possessive reflexive embedded in the indirect object (22b), but not a reflexive indirect object (22c) (Léa Nash, p.c.).[12] In (22a), the direct object has not scrambled, so cannot bind the anaphor in the indirect object. Parallel cases can be observed in (23) for Japanese (Yatsushiro 1997 and Takako Aikawa, p.c.).[13]

(22) a.?? Nino-m [*tav-is*$_i$ deda-s] [**bavSv-i**$_i$ anaxa].
N.-ERG self-GEN mother-DAT child-NOM showed-AOR
'Nino showed **the child**$_i$ to *his/her*$_i$ mother.'
b. Nino-m **bavSv-i**$_i$ [*tav-is*$_i$ deda-s] [*t* anaxa].
'(same as (22a))'
c. * Nino-m **bavSv-i**$_i$ [*tav-is tav-s*$_i$] [*t* anaxa].
N.-ERG child-NOM self-DAT showed-AOR
'Nino showed **the child**$_i$ to *him/herself*$_i$.'

(23) a.* Hiroshi-ga [*karezisin*$_i$-no hahaoya]-ni [**Osamu-o**$_i$ miseta].
H.-NOM self-GEN mother-DAT O.-ACC showed
'Hiroshi showed **Osamu**$_i$ to *his*$_i$ mother.'
b. Hiroshi-ga **Osamu-o**$_i$ [*karezisin*$_i$-no hahaoya]-ni [*t* miseta].
'(same as (23a))'
c. * Hiroshi-ga (kagami-o tukatte) **Osamu-o**$_i$ *karezisin*$_i$-ni [*t* miseta].
H.-NOM mirror-ACC using O.-ACC self-DAT showed
'Hiroshi showed **Osamu**$_i$ to *himself*$_i$ (using a mirror).'

---

[12] A nonsubject otherwise can bind *tavis tav*, for some speakers.

[13] According to Miyagawa (1997), cases like (23b) are fine with the reciprocal *otagai*. It may be that *otagai* has non-anaphoric uses (Hoji 1998, Ueyama 1998).

These examples have essentially the derivation shown in (20): the direct object raises into the maximal projection occupied by the indirect object (APPLP), so no anaphoric dependency can obtain between them.

(22) and (23) are closely analogous to the German examples (13)-(14). In German, however, the direct object appears to be generated in a position c-commanding the indirect object. When the indirect object scrambles over the direct object, no anaphoric dependency can obtain between them (24a), as noted above. If Lethal Ambiguity underlies the ill-formedness of (24a), it is possible that the scrambled indirect object could bind a reciprocal embedded within the direct object. In fact, such binding is possible.[14] On the other hand, the well-formedness of (24b) is unexpected if (24a) is ruled out by a language parameter.

(24) Gestern habe ich…
yesterday have I…
a. * …**den Gästen**$_i$ *einander*$_i$ [*t* vorgestellt].
the guests-DAT each other-ACC introduced
(lit.) 'Yesterday, I introduced *each other*$_i$ to **the guests**$_i$.' (=14b)
b. …**den Gästen**$_i$ [Freunde von *einander*$_i$] [*t* vorgestellt].
the guests-DAT friends-ACC of each other introduced
(lit.) 'Yesterday, I introduced friends of *each other*$_i$ to **the guests**$_i$.'

7 Conclusion

The evidence presented here suggests that local scrambling can be treated as A-movement, despite some apparent exceptions to the possibility of creating new binding relations. I have argued that these exceptions do not arise from a language-particular binding parameter, but rather fall under a general principle concerning A-movement, including movement to the subject position for Case/EPP. This principle (Lethal Ambiguity) ensures that binding cannot obtain between two DPs occupying specifiers of the same head. Since A-scrambling one DP past another always involves the two DPs occupying specifiers of the same head at some stage in the derivation, Lethal Ambiguity restricts the binding possibilities that arise in A-scrambling, or in A-movement of any kind.[15]

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[14] Miriam Eckert, Martin Hackl, Martin Kappus, and Beatrice Santorini (p.c.). Not all speakers get this contrast; some find [*X von einander*] strange in general.

[15] An issue not addressed here is the Condition C effects discussed by FLR (1996). They observe that scrambling one object over another repairs a Condition C violation, as one might expect with A-movement, while scrambling an object over the subject does not, as one might expect with A-bar movement. I know of no theory of scrambling that captures this difference without stipulation.

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Perception and Production of American English Tense and Lax Vowels by Japanese Speakers

Michelle Minnick Fox and Kazuaki Maeda

1 Introduction

It has been widely recognized that non-native speakers often have difficulty perceiving and producing phonemic contrasts in a second language (L2) that do not exist in their native language (L1). Best (1995) and Flege (1992) have claimed that the ability to perceive non-native contrasts is at least partially determined by the way that non-native phones are perceptually assimilated to their native phonetic categories. In this paper, we report the results of a perceptual and production study of native speakers of Japanese (J) of the American English (A.E.) contrast between the two high front vowels /i/ and /I/. Each of these two A.E. vowels can be considered phonemically equivalent to a different vowel in J, and many J speakers of A.E. are able to satisfactorily categorize these two A.E. vowels in the most favorable circumstances. However, because the primary acoustic cues used by speakers of the two languages are different, we hypothesized that the perception and production of the A.E. vowels by J speakers would be influenced by the native cues rather than the cues used by A.E. speakers.

The perception and production experiments described in this paper were designed to focus specifically on three questions:

- To what extent do native J speakers use duration versus vowel quality to perceptually distinguish A.E. /i/ and /I/?
- What are the acoustic characteristics of A.E. /i/ and /I/ produced by J speakers?
- What is the intelligibility of J speakers' productions of these vowels as judged by native A.E. speakers?

2 Background

Both Best (1995) and Flege (1992) account for at least some of an L2 speaker's difficulty in perceiving non-native contrasts by the way that the L2 sounds are perceptually assimilated to L1 categories. For example, according to Best's Perceptual Assimilation Model (PAM), a non-native speaker's perception relies to a large extent on the native phonemic category that is closest to the non-native category. Thus, if two different phonemes from the L2 are perceptually assimilated to the same category in the L1 (i.e. both sound like they belong to the same L1 category), and are considered relatively good fits to the category, this theory predicts that the contrast will be difficult to distinguish. A likely reason for this difficulty is that the L2 speakers continue to use the acoustic criteria which are important for discriminating phonemes in their L1.

Flege's (1995) Speech Learning Model (SLM) hypothesizes that the production of a phoneme often corresponds to the properties represented in its internal phonetic category representation. According to this theory, non-native-like production by more advanced L2 speakers is not *primarily* due to difficulty in motoric skills, although such difficulty may cause improvements in production to lag improvements in perception. Since the speaker's internal phonetic representation of a category is presumably closely related to how the speaker perceives the sound, we would expect non-native-like production to be highly correlated with non-native-like perception.

In Japanese, there are five pairs of long (two-mora) and short (one-mora) vowels. For each pair, the long and short vowel only differ in duration, while their vowel qualities are nearly identical (Shibatani, 1990). Thus, the primary acoustic cue distinguishing the two high front J vowels /i:/ and /i/ is duration. In contrast, the two high front A.E. vowels /i/ and /I/ differ in both vowel quality and in duration (Jones 1962, Klatt 1976). Many researchers consider vowel quality to be the primary cue to vowel identity in A.E., while vowel length is a phonologically redundant feature. Furthermore, the duration of an A.E. vowel is affected by various factors, including the following coda consonant, speech rate, stress, emphasis, and boundary condition. When these factors are fixed, /i/ is in general longer than /I/ (Peterson and Lehiste 1960), but when these are varied, the relative durations may vary, reducing the reliability of the duration cues.

Strange et al. (1996a, 1998) measured the perceptual assimilation of several A.E. vowels to J vowel categories by asking J subjects to indicate which J vowel was the most similar to each of the A.E. vowels used as stimuli. In addition, the subjects rated each of the vowels on a scale of 1-7 for "category goodness," with a 7 indicating the "best fit" to the Japanese category. Two types of stimuli were used in this study: a *disyllable condition*, where the vowels were presented in the context /hVba/, and a *sentence condition*, where the vowels were presented as part of the carrier phrase "I say the /hVb/ on the tape." The results that Strange et al. (1998) obtained for just A.E. /i/ and /I/ are shown in Table 1.

As the data in Table 1 indicate, in the *disyllable condition*, native speak-

	Disyllable condition			Sentence Condition		
AE vowel	Modal R	%	G	Modal R	%	G
i:	i	59	6	ii	83	6
I	i	58	3	i	77	4

Table 1. Data reported by Strange et. al (1998) on perceptual assimilation of A.E. /i/ and /I/ to Japanese categories

ers of Japanese responded most often ("Modal Response") that both the A.E. vowels /i:/ and /I/ were closest to the one-mora J vowel /i/, while in the *sentence condition*, the A.E. /i/ assimilated most often to the two-mora J vowel /ii/ and A.E. /I/ assimilated to the one-mora J vowel /i/. In both cases, the A.E. vowel /i:/ was rated higher in category goodness than /I/, indicating that the vowel quality of A.E. /i:/ is perceived as being somewhat closer to the vowel quality of the J high front vowels than A.E /I/. It is also important to note that in the absence of a "larger rhythmic context" (i.e. more than just two syllables), the subjects had difficulty using the duration information of the A.E. vowels in determining which J vowel was closest, even though the stimuli used for the disyllable condition had a similar duration contrast between the two vowels as the stimuli in the sentence condition.

If the hypotheses proposed by Flege and Best are correct, we would expect that since both A.E. /i/ and /I/ assimilate to the same vowel quality category, native J speakers will have difficulty categorizing the vowels, particularly when the vowel duration cues are removed or weakened. In the perceptual experiment, we therefore tested non-native speakers of English on their ability to categorize the two vowels both in words in isolation (weak duration cues) and in words in carrier phrases (robust duration cues). We also manipulated the duration cues in the stimuli to completely remove all duration cues and to make the duration cues contradict the vowel quality cues.

To test Flege's (1995) suggestion that experienced non-native speakers produce phonemes "correctly" according to their internal category representation, we had the same group of J subjects produce A.E. words containing the two vowels /i/ and /I/. If the subjects are both perceiving and producing the vowels according to their internal phonetic representations of these vowels, then we would expect to see a correlation between the subjects' use of acoustic cues in perception and production.

3 Perceptual Study

3.1 Stimuli

Three native speakers of A.E., two females and one male, produced the stimuli used in the perceptual portion of this study. The stimuli consisted of minimal pairs differing only in the vowel (/i/ vs. /I/), and all of the words used as stimuli were monosyllabic so that there would be no question as to which vowel was to be categorized. Since perceptual assimilation of L2 vowels to L1 categories can depend on the consonantal context as well as on the speaker (Strange et al. 1996b), the words used in the experiment were chosen to maximize the variety of consonantal contexts. The stimuli included words in isolation and words in the carrier phrase *Now say X again*.

All of the stimuli were recorded in a sound-attenuated room at 16kHz. The vowels in the stimuli were then manually labeled, and the durations of the vowels were modified in three different ways using the TD-PSOLA algorithm (Moulines and Charpentier, 1990), leaving the rest of each stimulus unmodified. This resulted in four token type variants of each stimulus:

- *natural token*: no duration modifications
- *shortened token*: length of the vowel shortened by a factor of 1/2
- *lengthened token*: length the vowel lengthened by a factor of 2
- *uniform token*: length of the vowel modified to within one pitch period of 140ms for all tokens

After the tokens were recorded and the three series of stimuli were created, a native speaker listened to all of the tokens. Due to the resynthesis involved in the duration modifications, some of the stimuli did not sound natural. If any of the stimuli of a given series was judged to sound unnatural or to not be a good exemplar of its phonetic category, all variants of that stimulus were removed from the stimulus set. The resulting set of stimulus tokens consisted of 20 minimal pairs in each of the 4 stimulus type series.

The acoustic characteristics of the *natural* tokens of the words spoken in isolation are shown in Table 2. The mean values for duration (ms), F1 (Hz), and F2 (Hz) are shown. The values in parentheses indicate one standard deviation. The acoustic characteristics of the other token types vary from these values only in their duration.

3.2 Test Format

The format of the perceptual study consisted of a two-choice forced identification task. For each question, the subject heard the stimulus, and had to

		Duration (ms)	F1 (Hz)	F2 (Hz)
Speaker 1 (F)	/i/	200 (57)	373 (25)	2743 (51)
	/I/	134 (32)	532 (51)	2112 (126)
Speaker 2 (F)	/i/	156 (35)	385 (27)	2804 (94)
	/I/	116 (14)	421 (52)	2503 (198)
Speaker 3 (M)	/i/	140 (44)	257 (13)	2278 (104)
	/I/	129 (23)	387 (47)	1854 (75)

Table 2. Acoustic characteristics of the vowels of the words in isolation in the perception study (*natural* tokens only). The values in parentheses indicate one standard deviation.

enter on the computer whether the vowel in the word was the same as the vowel in the word *beat* or the vowel in the word *bit*. Reference to the actual words in the minimal pair was avoided to reduce confusion between the vowel sound and English orthography. The subjects were instructed to listen only for the vowel sound rather than trying to identify the word that was spoken. No feedback was provided to the subjects during any portion of the test.

3.3 Test Procedure

The perceptual test was performed on the computer in a quiet lab using headphones set to a comfortable listening level. The test was self-paced; subjects controlled the playing of the stimulus and were permitted to listen to a stimulus token more than once if needed, although they were discouraged from listening to a particular stimulus more than necessary.

The perceptual test was divided into four separate sections:

1. *Natural, lengthened,* and *shortened* stimuli; words in isolation
2. *Natural, lengthened,* and *shortened* stimuli; words in carrier phrase
3. *Uniform* stimuli only; words in isolation
4. *Natural* stimuli only; words in isolation

The questions within each section were presented to each subject in a random order, thereby mixing the stimuli produced by the different speakers (and of the stimuli of different length types in the first two sections). For sections 1, 2, and 3 of the test, the subjects were notified that the durations of the vowels in some of the stimuli might have been modified. The entire testing session lasted approximately 30 minutes.

3.4 Results

A total of 12 native speakers of Japanese participated in the perceptual portion of the study. The speakers ranged in age from 23 to 35 (average 28.5). All were living in the United States at the time, for an average of 18.4 months.

Figure 1 shows the percent correct for each of the subjects across all sections of the test. Figure 2 shows the data for the section of natural words in isolation only (section 4) and the section of uniform words in isolation only (section 3). Several of the subjects performed at over 90% correct on the natural tokens. However, nearly all of the subjects, especially those who did well on the natural tokens, performed worse on the section of uniform tokens than they did on natural tokens. This indicates that while the nonnative speakers are able to achieve high levels of performance on tokens with the duration information present, when the duration information is not available, subjects are less able to properly use spectral information to classify the tokens. Because the subjects were able to perform better on the natural tokens of words in isolation than on the uniform tokens of words in isolation, the subjects must have been able to use the duration information available, even though the cues to duration were relatively weak in the absence of the whole sentence.

Figure 3 breaks down the performance across all subjects for each of the

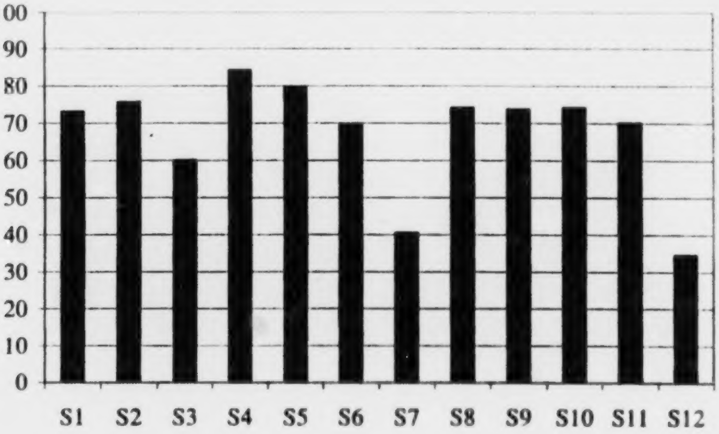

Figure 1. Percent correctly identified on the perceptual test by each of the subjects on all tokens.

token types (lengthened, natural, and shortened) for each of the vowels in section 1 (isolated words) and section 2 (in carrier phrase) of the test. Performance on these tokens is of particular interest because these tokens not only require the subjects to attend to the spectral information to correctly identify the vowel, but in the case of the shortened /i/ and lengthened /I/, in order to correctly identify the tokens, the subjects need to *disregard* the conflicting temporal information. As we would expect if the subjects rely on duration cues, the subjects performed better on the lengthened /i/ than on the natural /i/, and they performed much better on both of these than on the shortened /i/. The opposite pattern is found in the subjects' performance on

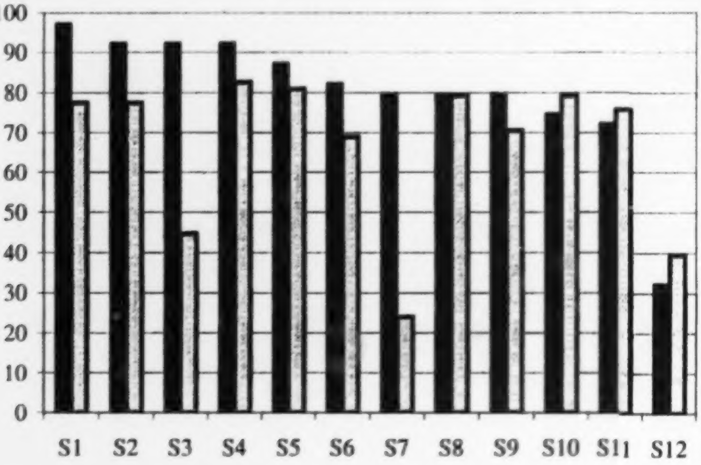

Figure 2. Percent correctly identified by each of the subjects on natural tokens (black) and on uniform length tokens (gray).

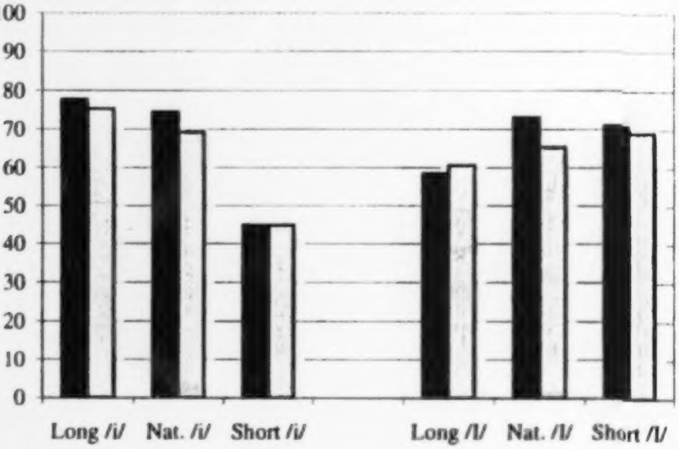

Figure 3. Percent correctly identified by token type for isolated words (black) and words in carrier phrases (gray).

/I/, with performance on lengthened /I/ worse than performance on natural /I/ and shortened /I/. Thus it appears that the subjects are attending to the duration cues. However, if the subjects were only using duration cues, we would expect a very low (close to 0%) performance on shortened /i/ and lengthened /I/. Since they perform better than this, the subjects must be able to attend to the spectral cues to a certain degree. The fact that the difference between lengthened and shortened /i/ is much greater than the difference between lengthened and shortened /I/ is consistent with the hypothesis that the subjects are able to use spectral cues to a certain extent in their categorization; the average vowel in the case of lengthened /I/ is longer than in the case of shortened /i/, so that the subjects have longer time to attend to the spectral cues in lengthened /I/.

Further evidence that the subjects rely primarily on duration cues when those cues are available, but are also able to use spectral information somewhat, is shown in Figure 4. Figure 4 shows three ratios for each of the speakers that produced the tokens used in the test:

- the ratio between the average *duration* of /i/ and /I/,
- the ratio between the average *F1* of /i/ and /I/, and
- the ratio between the average *F2* of /i/ and /I/.

Also plotted on the same graph are the overall percent correct by all subjects for each of the speakers for both the uniform tokens and the natural tokens. As the plot indicates, the performance on the natural tokens, which is in general higher than the performance on uniform tokens (with the exception of Speaker 3's tokens, where performance was nearly identical for both types of

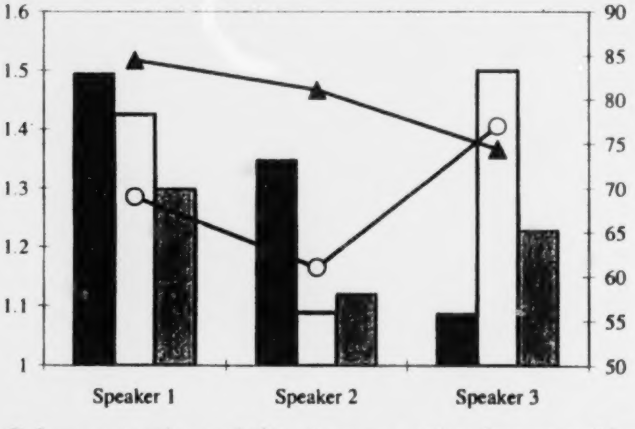

Figure 4. Columns (scale on left): Average ratios between /i/ and /I/ in duration (black), F1 (white), and F2 (gray). Lines: Performance by all subjects on each speaker's tokens; natural tokens only (triangles), uniform tokens only (circles).

tokens), is more closely related to the duration ratio; the subjects performed best on tokens produced by the speaker with the greatest average duration distinction between the two vowels. In contrast, performance on the uniform tokens, when duration information is absent, is more closely related to the F1 ratio.

Thus, in classifying natural tokens, subjects appear to rely on duration to a great degree. When the duration cues are removed, subjects use (at least to some extent) the spectral cues. Some subjects attain a high level of performance on natural tokens, but the performance on uniform tokens does not achieve native levels.

Since native speakers of A.E. perform at or near 100% for all token types[1], the results from the perception study indicate that the Japanese speakers are *not* using the same acoustic cues in perception as native speakers of A.E. However, because many of the Japanese speakers do attain a high level of correct categorization of natural tokens, it is unlikely that these speakers receive the type of feedback necessary to modify their internal phonetic category representation of the two vowels. If this is the case, we might expect this to be reflected in their production as well, causing their distinction between the two vowels to be primarily in vowel duration and only secondarily in vowel quality.

4 Production Study

4.1 Recording Procedure

Seven of the subjects from the perception experiment participated in the production portion of the study. Each of the vowels were recorded in the context /h_C/, where there were three different following coda consonants /C/: /p/ (unvoiced stop), /d/ (voiced stop) and /m/ (nasal). Each of the words was recorded three times each in each of three situations:

- word in isolation
- word in the carrier phrase *Now X is the word I say*
- word in the contrastive phrase *The word is X (*ex. *"heed"), not Y ("hid")*

Each of the words or phases was presented to the subject on a computer screen in randomized order, with an interval of five seconds between words.

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[1] Two native speakers of A.E. took the perceptual test. One performed at 100% for all token types, and the other performed at 100% for all tokens types other than shortened /i/, where she performed at 98%.

The subjects were recorded in a sound-attenuated room. The recordings were digitized at 16kHz with 16-bit quantization on a Sun workstation, and the acoustic measurements were taken using Entropic Research Laboratories Waves+ and ESPS software. Vowel duration was measured by manually labeling the beginning and the end of each vowel. Formant values were calculated using the results of a 12th order LPC analysis that had been visually checked with wide-band spectrograms and corrected as necessary by the authors. The means of F1 and F2 in the central one third of each vowel were recorded for later analysis.

4.2 Intelligibility Procedure

In addition to an objective measure of the performance of the subjects according to the duration, F1, and F2 characteristics of the two vowels, an intelligibility test was also conducted of the recordings of the words in isolation produced by the J subjects. For each of the subjects, there were 2 vowels * 3 contexts * 3 repetitions = 18 tokens to be evaluated. Four native speakers of A.E. listened to each of tokens produced by each of the subjects 3 times. The tokens were presented in randomized order, to prevent the evaluators from adjusting their criteria according to the Japanese speaker as much as possible. The evaluators were instructed to respond with either /i/ or /I/ according to which vowel the production *sounded* more like, not according to what they thought the speaker intended to produce. In the rare cases that the vowel sounded more like a vowel other than /i/ or /I/, the evaluators were forced to select which one of these two vowels it sounded *more* like.

The format for the evaluation was similar to that of the perception test; the evaluators were able to listen to each token as many times as desired before selecting one of the two vowels.

4.3 Results

Table 3 shows the average durations of the vowels produced by the J subjects, and Figure 5 shows plots of the average F1 and F2 values. Because the phrase type did not have a significant effect on either the durations or the formants of the productions, data from all phrase types are included together. The following coda consonant had an effect for the duration, but not for the formants, so only the duration information is separated according to coda consonant. The effect of the coda type is consistent with the results of other studies of native A.E. speakers' productions (for example, Peterson and Lehiste, 1960); the mean duration of the vowel is approximately 30% longer

	/hip/	/hid/	/him/	/hIp/	/hId/	/hIm/	Ave. ratio
S1	146 (27.9)	212.6 (45.4)	210.9 (45.4)	116.8 (23.6)	140.3 (37.3)	132.7 (30.5)	1.46
S3	180.4 (31.1)	260.3 (25.2)	261.8 (38.7)	90.6 (14.3)	112 (13.6)	114.8 (22.2)	2.20
S5	143.6 (31.1)	192 (37.5)	174.9 (46.3)	83.2 (12.0)	122.9 (16.8)	107.8 (14.2)	1.61
S6	187.4 (32.5)	232.4 (29.6)	255.6 (47.3)	99.7 (23.0)	118.6 (17.4)	144.6 (52.3)	1.86
S8	188.4 (39.2)	267 (46.3)	212.6 (35.0)	147.3 (35.0)	176.4 (36.7)	172.4 (29.5)	1.36
S10	144.1 (18.3)	201.2 (27.2)	202.9 (22.0)	115.7 (13.9)	129.2 (12.2)	129.3 (11.3)	1.46
S12	150 (35.2)	204 (48.2)	216.9 (31.6)	104.9 (14.7)	120.8 (19.1)	113.9 (18.1)	1.69

Table 3. Duration of vowels (in ms) produced by each subject by context.

when the coda is a voiced stop than when the coda is a voiceless stop. Across all speakers, the ratio of /i/ to /I/ was 1.66 to 1. Individual speakers ranged from a smallest ratio of 1.36:1 (Subject 8) to a largest ratio of 2.20:1 (Subject 3). Thus, the J subjects consistently distinguished the two vowels in duration, and the ratio was greater than that of the vowels produced by the native A.E. speakers for the perceptual test (see Figure 4).

As the plots in Figure 5 indicate, with the exception of subject S12, all of the J subjects' average /i/ had a lower F1 and a higher F2 than the average /I/. This tendency follows the difference in F1 and F2 values as produced by native speakers of English. However, many of the J subjects whose two vowels had a ***significantly different mean value*** did not produce the vowels in a manner that would allow for easy categorization of the two vowels according to their vowel quality. This is shown by the fact that for F2, subjects S3, S6, and S8 do produce mean differences with the proper tendency, but there are overlaps in the distributions of the two vowels, as measured by the error bars of one standard deviation overlaid on the means.

The extent of overlap in the vowel quality of /i/ and /I/ is more clearly seen in the plots of individual tokens as a function of the first and second formants in Figure 6. The plot for some of the subjects, in particular S1, shows two distinct distributions for the two vowels, while the plot for other subject, in particular S12, shows a clear lack of separation of the two vowels. The plot of individual tokens produced by a native speaker of A.E. also

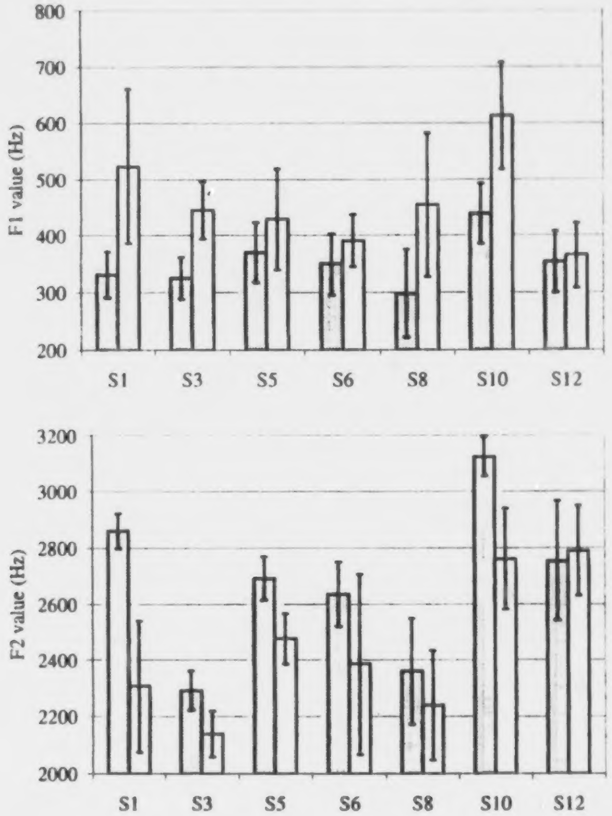

Figure 5. Average F1 (top plot) and average F2 (bottom plot) for each of the J subjects for all productions of the vowel /i/ (gray) and the vowel /I/ (white). The error bars indicate one standard deviation.

shows two distinct distributions for the two vowels, as we would expect.

Although the relative distributions of F1 and F2 for the two vowels clearly indicate that vowel quality cannot be used to distinguish /i/ and /I/ produced by some of the speakers, the F1/F2 plots cannot be used exclusively to measure whether the subjects have mastered the production of A.E. /i/ and /I/. Instead, the extent to which the productions are intelligible to native speakers of A.E. is a better gage. Figure 7 shows the average intelligibility score for each subject as well as the intelligibility of each of the two vowels. The correlation between the ratio of each of the acoustic characteristics (duration, F1 and F2) and overall intelligibility was measured:

- Duration and overall intelligibility: $r = 0.158$
- F1 and overall intelligibility: $r = 0.429$
- F2 and overall intelligibility: $r = 0.775$

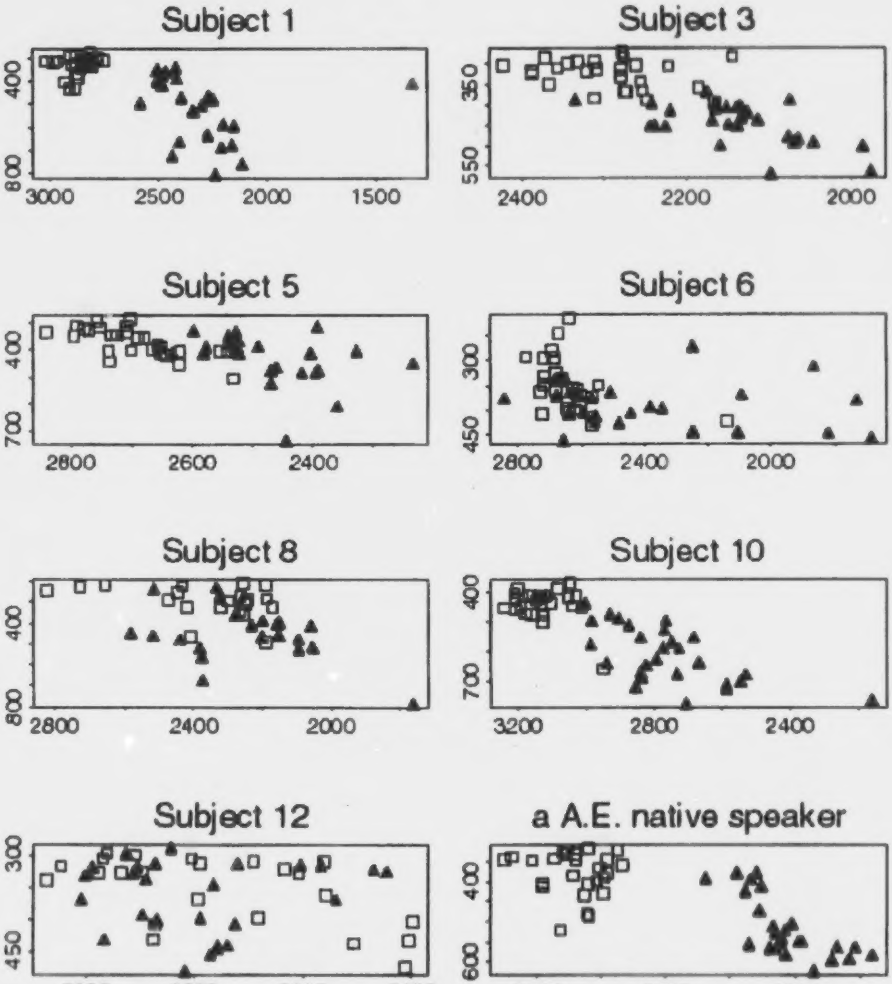

Figure 6. Vowel quality as measured by F1 (y axis) and F2 (x axis) for each of the Japanese subjects and one native speaker of English. Open squares: /i/; Solid triangles: /I/.

As expected, the ratio of average duration and overall intelligibility are not closely correlated, but the ratio of the formants (and in particular the ratio of average F2's) have much higher correlation factors. This confirms that the subjects who make the most distinction in vowel quality are in general the most intelligible.

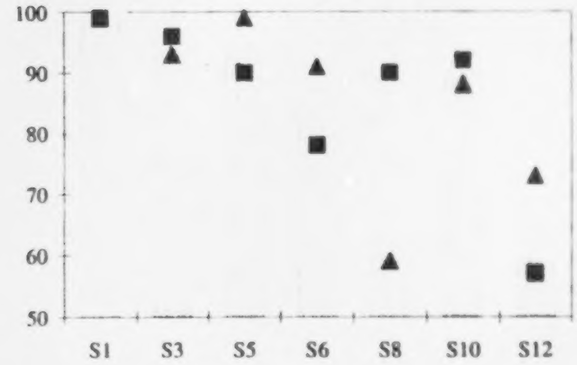

Figure 7. Overall intelligibility (column), intelligibility of /i/ (triangles), intelligibility of /I/ (squares).

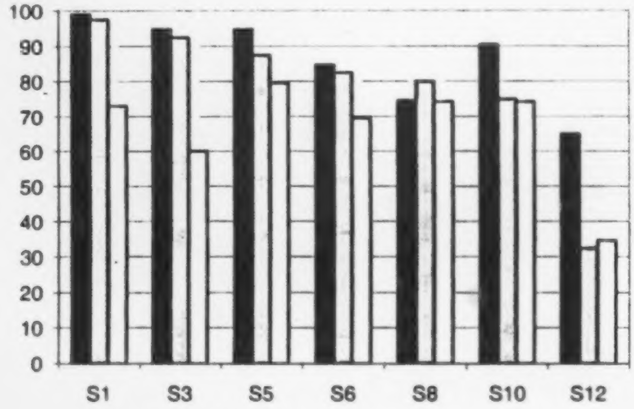

Figure 8. Average intelligibility (black), perceptual performance on natural tokens only (gray), and overall perceptual performance (white)..

5 Discussion

In both perception and production, the J subjects consistently distinguish /i/ and /I/ according to duration, but the extent of vowel quality distinction varies by subject. Despite varying levels of vowel quality use, nearly all of the subjects performed above chance on the perception of uniform tokens and made a *statistically significant* difference in the mean values of the formants, although the distributions sometimes overlapped. Therefore, the subjects have begun to learn to use vowel quality to some extent, which is particularly interesting since several of the subjects reported that they were unaware of any vowel quality distinction between the two vowels.

Figure 8 shows a comparison of overall intelligibility and performance on the perceptual portion of the study for each of the subjects. In addition, the correlation was calculated between the overall intelligibility and the perceptual performance on three different types of tokens:

- Perception of natural tokens and overall intelligibility: $r = 0.863$
- Perception of uniform tokens and overall intelligibility: $r = 0.422$
- Overall perception and overall intelligibility: $r = 0.667$

Thus, the subjects' perceptual performance on just natural tokens is highly correlated with overall intelligibility. This result is consistent with Flege's SLM which hypothesizes that improved production should follow improved perception; in general, the subjects who perceived the distinction the best were also able to produce it most intelligibly.

However, a comparison of the correlations across the three token types is somewhat surprising. Since the SLM predicts that native-like production requires native-like perception, we would expect that the subjects who are best able to use the proper acoustic cues in production must also be able to use the same cues in perception. As shown above, intelligibility is more related to vowel quality than to vowel duration distinction, so those subjects who are the most intelligible (i.e. use vowel quality effectively in production) should be able to use vowel quality the most effectively in perception. Following this line of reasoning, overall intelligibility should be highly correlated with the perception of the *uniform* tokens, since these tokens have only a vowel quality distinction. Surprisingly, of the three token types considered, the perception of uniform tokens is the weakest predictor of intelligibility.

Although our results appear to be inconsistent with the SLM's prediction that the use of vowel quality in perception should develop before the use of a vowel quality distinction in production, this is not necessarily the case. In the present study, we focused on including a great deal of variation in phonetic context and speaker to ensure accurate measurements of the subjects' overall use of cues. However, to keep the perceptual test to a reasonable length, this choice limited the number of different duration types that could be included, and our stimuli sets only contained tokens with either (1) natural duration cues, (2) no duration cues, (3) exaggerated duration cues, or (4) the "wrong" duration cues. As we saw in the production portion of the study, J subjects' productions include a complex relationship between the use of duration and the use of vowel quality. A perceptual study similar to the present one with more gradation in duration cues, particularly between the *natural* token types and the *uniform* token types, may reveal that a similarly complex relationship in perception exists. Such a study may also show that the most intelligible speakers tend to use vowel quality to a greater degree in perception than less intelligible speakers do, even though they still use duration cues as well.

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The Syntax of Adjunct Wh-NPs[*]

Masao Ochi and Tien-Hsin Hsin

1 Introduction

This paper investigates the type of wh-questions, studied by Kurafuji (1996a, b, 1997), in which the wh-word used is 'what,' but in which the interpretation is best translated as 'why.' Kurafuji reports that this construction is found in Japanese, Russian, and Modern Greek (1): As the translations show, 'what'-questions here are interpreted as 'why'-questions.

(1) a. John-wa **naze/nani-o** awateteiru no? (Japanese)
John-TOP **why/what-Acc** panicking Q
'Why is John panicking?'
b. **Pochemu/Chto** ty smejoshsja? (Russian)
why/what you laugh
'Why do you laugh?'
c. **Giati/Ti** trehi esti aftos? (Modern Greek)
why/what runs so he
'Why is he running like this?' (cf. Kurafuji 1996a, b, 1997)

There are some pragmatic restrictions on the use of the question with this *what*. Among other things, this type of wh-question is most appropriate in a context in which the speaker is emotionally affected (i.e., puzzled, annoyed, etc.). For instance, although the examples in (2) are synonymous, (2b) with *nani-o* 'what' is best uttered in a situation in which the speaker is annoyed by John's running, or (s)he thinks that there is no need for John to run. Thus, it is more appropriate to translate *nani-o* in (2b) as "why the hell." We will come back to this point in section 4.

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[*] This is a preliminary report of a larger work in progress. For help with judgments as well as useful discussions, we thank Klaus Abels, Sigrid Beck, Zelyko Bošković, Edit Doron, Miriam Engelhardt, Hajime Hoji, Pai-Ling Hsiao, Howard Lasnik, Shigeru Miyagawa, Nobu Miyoshi, Rosanne Pelletier, William Snyder, Penka Stateva, Arthur Stepanov, Sandra Stepanović, Koji Sugisaki, and Saša Vukić as well as the audience at the 23rd Penn Colloquium.

(2) a. John-wa **naze** hashitteru no?
John-Top **why** running Q
'Why is John running?'
b. John-wa **nani-o** hashitteru no?
John-Top **what-Acc** running Q
'Why the hell is John running?'

Note that (2a) can be used in the same set of contexts suitable for (2b), but it is also felicitous in emotionally neutral contexts.

Kurafuji (1996a, b, 1997) also points out that this 'why'-like 'what' (henceforth 'adjunct wh-NP') shares some properties with true adjunct wh-phrases (such as locality effects; see below). We argue that the adjunct wh-NP is a strongly focused wh-phrase which originates as a VP-adjunct. We also claim that properties of the adjunct wh-NP bear crucially on such theoretical issues as the nature of unselective binding, i.e., the proposal that unselective binding is available for nominal wh-phrases but not for wh-adverbials (cf. Tsai (1994) and Reinhart (1995)). Based on the island sensitivity of the adjunct wh-NP in Japanese, we suggest that it is the argument vs. adjunct distinction that is relevant for unselective binding, contrary to Tsai (1994) and Reinhart (1995).

This paper is organized as follows. In section 2, we introduce more languages which allow adjunct wh-NPs. Section 3 deals with the question of where adjunct wh-NPs are base-generated. Based on Chinese data, we argue that they are adjuncts within VPs. In section 4, some peculiar properties of adjunct wh-NPs are discussed with respect to sluicing, locality, and multiple wh-questions. Concluding remarks are given in section 5.

2 More Languages with Adjunct Wh-NPs

We first demonstrate that the existence of the adjunct wh-NP is more widespread than reported by Kurafuji (1996a, b, 1997). Our preliminary investigation indicates that the adjunct wh-NP is attested also in Chinese (3), German (4), Hebrew (5), Bulgarian (6), and Serbo-Croatian (SC) (7).[1] We will examine Chinese in the following section. As for the Bulgarian data in (6) and SC in (7), the (a)-examples are matrix questions and the (b)-examples are indirect questions.

(3) a. John **weisheme** huang?
John **why** hurry/panic
'Why is John hurrying/panicking?'
b. John huang **sheme**?
John hurry/panic **what**
'Why is John hurrying/panicking?' (Chinese)[2]
c. Wo xiang-zhidao [John huang **sheme**].
I wonder John hurry/panic **what**
'I wonder why John is hurrying/panicking.'
(4) Ich frage mich, **warum/was** Hans so gestresst ist.
I ask myself **why/what** Hans that stresses is.
'I wonder why Hans is so stressed.' (German)
(5) a. **Lama/Ma** ata rac?
why/what you run
'Why are you running?' (Hebrew)
b. **Lama/Ma** ata kore et ha-sefer ha-ze?
why/what you read Acc the-book the-this
'Why are you reading this book?'

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[1] English allows a similar construction with the verb *care*. As shown in (ia), *care* does not take a direct object but allows *what* to cooccur, as in (ib). Its interpretation is similar to (ii).

(i) a. John cares *(about/for) a novel.
b. What do you care if John buys a new car?
(ii) Why do/should you care if John buys a new car?

[2] Kurafuji (1996a) claims that Chinese does not have the adjunct wh-NP, based on the ungrammaticality of (i).

(i) *Ni **weisheme/*sheme** kude zheme lihai?
you **why/what** cry so much
'Why do you cry so much?'

As can be seen in (3), however, the adjunct wh-NP does occur in Chinese, but is restricted to a postverbal position.

(6) a. **Zašto/Kakvo** si se umârlusila?
why/what aux self get down
'Why are you so depressed?' (Bulgarian)
b. Čudja se **zašto/kakvo** si se umârlusila.
wonder (1, sg.) self **why/what** aux self get down
'I wonder why you are so depressed.'

(7) a. **Zašto/Šta** si ustao tako rano?
why/what have get up so early
'Why did you get up so early?' (Serbo-Croatian)
b. Pitam se **zašto/šta** si ustao tako rano.
ask (1, sg) self **why/what** have get up so early
'I wonder why you got up so early.'

3 Adjunct Wh-NPs as VP-adjuncts

Where does the adjunct wh-NP originate? We believe that Chinese is particularly informative in dealing with this question, since, like Japanese, it is a wh-in-situ language and, unlike Japanese, exhibits a rather rigid word order. Based on the evidence from this language, we suggest that the adjunct wh-NP is a VP-level adjunct.

As we can easily verify in (3), pure adjuncts such as *weisheme* 'why' and the adjunct *sheme* 'what' occupy different positions; the former occurs preverbally and the latter postverbally. Although the phrase structure status of Chinese has been under debate, let us follow Huang (1994) and assume that verbs in Chinese do not raise out of VP overtly. Some evidence for this claim is provided by the fact that verbs in Chinese never precede a negative element such as *bu* 'not,' as shown in (8). In this respect, Chinese patterns with English rather than French (cf. 9).

(8) Negation *bu*: √ preverbal, * postverbal
a. John bu xihuan Lisi.
John not like Lisi
'John does not like Lisi.'
b. *John xihuan bu Lisi
John like not Lisi
'John does not like Lisi.'

(9) a. John does not love Mary. (*John runs not.)
b. John ne aime pas Mary.
John like Neg Mary
'John does not like Mary.'

In addition, the adjunct wh-NP *sheme* 'what' occurs only postverbally:

(10) adjunct wh-NP *sheme*: * preverbal, √ postverbal
a. John huang **sheme**?
John hurry/panic **what**
'Why is John running/panicking?'
b. *John **sheme** huang?
John **what** hurry/panic (Chinese)

(11) to (13) show various kinds of adjuncts in Chinese, only the first of which patterns with adjunct wh-NPs: nominal duration adverbs in (11). Temporal/locative PP adjuncts occur only preverbally (12), and other manner adjuncts (involving *de*) occur either preverbally or postverbally (13).

(11) Duration adverbs: * preverbal, √ postverbal
John (*san-ci) pao-le san-ci.
John run-Asp three-times
'John ran three times.'
(12) PP adjuncts (temporal/locative): √ preverbal, * postverbal
John [zai libaitian] shuejiao (*zai libaitian).
John on Sunday sleep
'John sleeps on Sunday.'
(13) Manner adverbs: √ preverbal, √ postverbal
a. John [hen renzhen de] gong-zuo.
John very serious DE work
'John works very seriously.'
b. John gong-zuo [de hen renzhen].
John work DE very serious

In fact, the adjunct wh-NP *sheme* 'what' and nominal duration adverbs show an almost parallel distribution in transitive contexts as well, as shown in (14) and (15), thereby confirming the adjunct status of *sheme* 'what.'

(14) a. John qiao-le **san-ci** men.
John knock-ASP **three-times** door
'John knocked on the door three times.'
b. John qiao men qiao-le **san-ci**.
John knock door knock-Asp **three-times**
'John knocked on the door three times.'
(15) a. John qiao **sheme** men?
John knock **what** door
'Why is John knocking on the door?'
b. ?John qiao men qiao **sheme**?
John knock door knock **what**
'Why is John knocking on the door?'

As for the structure of (14a), Huang (1994) argues that there is a V-to-V movement within VP, as shown in (16) (for Huang, XP is identified as a nominal IP, the gerundive construction).

(16) John Infl [$_{VP}$ knock [$_{XP}$ three-times [X [$_{VP}$ t$_{knock}$ door]]]]
↑_______________________| (cf. Huang 1994)

Let us consider (15a). The fact that the adjunct wh-NP occurs between a verb, which stays within VP, and the direct object indicates that adjunct wh-NPs (as well as duration adverbs) are within VP.[3] Note that the pure adjunct wh *weisheme* 'why' occurs higher, as suggested by the word order in (3a). We suggest that *weisheme* 'why' is an IP-level adjunct while the adjunct *sheme* 'what' is a VP-level adjunct.

4 Adjunct Wh-NPs and Some Theoretical Issues

In this section, we discuss a few peculiar properties of the adjunct wh-NP which distinguish them from other 'ordinary' wh-phrases.

4.1 Sluicing

One curious aspect of the adjunct wh-NP is the fact that cross-linguistically, it does not occur in sluicing constructions, unlike other wh-phrases, including 'why'. In (17-20), we show data from four languages to illustrate the point: Japanese, German, Hebrew, and Serbo-Croatian.

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[3] This view is different from Kurafuji's (1997) claim that adjunct wh-NPs are base-generated outside the VP. We cannot discuss his arguments for lack of space. See Ochi and Hsin (in progress) for details.

(17) John-ga awateteiru ga, ...
John-Nom panicking but
a. dare-mo **naze** (kare-ga awateteiru) ka siranai.
nobody **why** he-Nom panicking Q know-not
'John is panicking, but nobody knows why.'
b. dare-mo **nani-o** ??(kare-ga awateteiru) ka siranai.
nobody **what-Acc** he-Nom panicking Q know-not
'John is panicking, but nobody knows why.' (Japanese)[4]

(18) Hans ist gestresst, aber ...
Hans is stressed, but
a. ich weiss nicht **warum** (Hans ist gestresst).
I know not **why** Hans is stressed
b. ich weiss nicht **was** *(Hans ist gestresst).
I know not **what** Hans is stressed
'Hans is stressed but I don't know why.' (German)

(19) Yosi ruc aval aui lo yodea **lama/*ma**.
Yosi run but I not know **why/what**
'Yosi is running but I don't know why.' (Hebrew)

---

[4] Some Japanese speakers find (17b) marginally acceptable. Interestingly, however, even those speakers do not accept the relevant sluicing example without the Case marker *-o* (i), although the Case marker on the wh-phrase is normally optional in sluicing (ii) (in fact, dropping of the Case marker is preferred for many speakers).

(i) *... dare-mo [**nani** ka] siranai.
nobody **what** Q know-not
' ... nobody knows why.'
(ii) John-ga nanika-o kattekita ga, daremo **nani(-o)** ka siranai.
John-Nom something-Acc bought but nobody **what-Acc** Q know-not
'John bought something, but nobody knows what.'

(20) A: Vidi Ivana, sav se pokunjio.
look-at Ivan, all self got-depressed
'Look at Ivan, he is all depressed.'
B: a. Da, zanima me **zašto** (se pokunjio).
yes it-interests me **why** self got-depressed
'Yes, I'd like to know why (he got depressed).'
b. Da, zanima me **šta** *(se to on pokunjio).
yes it-interests me **what** self he got-depressed
'Yes, I'd like to know why (he got depressed).' (SC)

We suspect that this fact has something to do with the strongly focused nature of the adjunct wh-NP. As noted at the outset, a question with the adjunct wh-NP is always accompanied by the speaker's strong emotions (often negative) toward the event or state described in that question, which is not always the case with pure 'why'-questions (see (2b)).

Let us therefore entertain the following hypothesis.

(21) A 'strongly' focused wh-phrase does not license sluicing.

Note in this connection that the English *wh-the-hell* phrase (cf. Pesetsky 1987) likewise does not occur in sluicing constructions (22b').

(22) John seems to have kissed someone, but ...
a. I have no idea who he kissed.
a.' I have no idea who.
b. (?)I have no idea who the hell he kissed.[5]
b.' *I have no idea who the hell.

Further, as Lasnik and Saito (1992) point out, the *wh-the-hell* phrase patterns with adjunct wh-phrases in its distribution. (23a-b) shows that in English, only argument wh-phrases are allowed in-situ. As shown in (23c), the *wh-the-hell* phrase patterns with adjunct wh-phrases in this respect. Also, movement of the *wh-the-hell* phrase out of an island yields a strong violation as shown in (24c).

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[5] Speakers tend to find (22b) slightly awkward. Still, what is crucial for us is the fact that all speakers find a clear contrast between (22b) and (22b').

(23) a. Who bought what?
b. *Who left why?
c. *Who bought what-the-hell? (cf. Pesetsky 1987)

(24) a. ??What do you wonder [who wrote t]?
b. *Why do you wonder [who left]?
c. *What the hell do you wonder [who wrote t]?
(Lasnik and Saito 1992)

Thus the adjunct wh-NP and the *wh-the-hell* phrase share several properties in common. In order to account for the adjunct-like behavior of the *wh-the-hell* phrase, Lasnik and Saito (1992) argue that this phrase is focused in nature and must occur in an adjoined position at some point in the derivation. If so, the fact shown in (22b') may fall under the scope of the hypothesis in (21).

There is another case of sluicing from SC which may be relevant. As Željko Bošković (p.c.) points out, wh-questions in SC with the complementizer *li* do not license sluicing either. *Li* is normally used in cleft-type constructions and it involves strong focus. This is another case where sluicing is not allowed due to the strongly focused element being involved.

(25) Marija voli nekog. *Pitam se koga li.
Maria likes someone I-ask self who Q
'Maria like someone. I wonder who.'

The question is why strongly focused wh-phrases (or complementizers) resist sluicing. Note that sluicing is one way of enhancing the focusing property of the wh-phrase. It could be then that sluicing wh-phrases which are already 'strongly' focused wh-phrases is somewhat redundant. But we must leave this question open.

4.2 Locality

The adjunct wh-NP also raises interesting questions for locality issues. We will discuss two language groups separately; wh-in-situ languages and wh-fronting languages.

Let us first discuss wh-in-situ languages. As observed by Kurafuji (1996a, b, 1997), the interpretation of the adjunct wh-NP *nani* 'what' in

Japanese is not clause-bound, as shown in (26a), although it is sensitive to islands such as the complex NP island (26b).[6]

(26) a. (?)Kimi-wa [John-ga **nani-o** awateteiru to] omou no?
you-Top John-Nom **what-Acc** panicking that think Q
'Why do you think that John is panicking?'
b. *Kimi-wa [[**nani-o** awateteiru] hito]-o shikatta no?
You-Top **what-Acc** panicking person-Acc scolded Q
'*Why did you scold [a person [who was panicking t]]?'

In this respect, the adjunct wh-NP in Japanese patterns with true adjunct wh-phrases such as *naze* 'why.' In languages such as Chinese and Japanese, adjunct wh-phrases but not argument wh-phrases are subject to islands such as the Complex NP constraint (cf. Huang 1982 and Nishigauchi 1986).

(27) a. John-ga [[**nani-o** katta] hito]-ni atta no?
John-Nom **what-Acc** bought person-Dat met Q
'??What did John meet a person [who bought t]?'
b. *John-ga [[**naze** hon-o katta] hito]-ni atta no?
John-Nom **why** book-Acc bought person-Dat met Q
'*Why did John meet a person [who bought a book t]?'

The fact that the adjunct wh-NP patterns with *naze* 'why' has theoretical implications for the nature of unselective binding.[7] Tsai (1994) and Reinhart (1995) claim that only nominal wh-phrases can be licensed by unselective binding (hence without movement), an option not available for adverbial wh-phrases. Hence, non-nominal wh-phrases such as *naze* 'why' must move to the spec of the Q-Comp for interpretation, thus violating the island constraint in examples such as (27b).

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[6] We will leave aside Chinese, since there is a variation with respect to the locality of the adjunct *sheme* 'what.' Some speakers accept examples like (i) while others find such examples somewhat degraded.

(i) Ni renwei John qiao **sheme** men?
you think John knock **what** door
'Why do you think [John is knocking on the door t]?'

[7] We thank Nobuhiro Miyoshi (p.c.) for this point.

Regarding the noun vs. non-noun distinction, Reinhart provides empirical evidence for the distinction. Consider (28). Let us assume with Chomsky (1995) that English wh-in-situ is licensed via unselective binding. Given that *how* and *what way* are synonymous, the contrast in grammaticality in (28) could be due to the categorial difference between the two wh-phrases; *what way* is an NP whereas *how* is not. Hence only *what way* in (28b) can be licensed by unselective binding, according to Reinhart.

(28) a. *Who kissed Mary how?
b. Who kissed Mary [$_{NP}$ what way]? (cf. Reinhart 1995)

As we saw in (26b), however, the adjunct wh-NP is not licensed by unselective binding, despite the fact that it is a noun. Hence, we conclude that the nominal status of an in-situ wh-phrase is not sufficient for unselective binding. Then, departing from Tsai (1994) and Reinhart (1995), we make the following claim:

(29) Only argument wh-(nominal) phrases can be licensed via unselective binding.

It is not totally obvious to us if 'argumenthood' is a sufficient condition for unselective binding, or if a wh-phrase must also be a nominal for the purpose of unselective binding. Either way, according to (29), the adjunct wh-NP cannot be licensed via unselective binding, because it is not an argument (although it remains to be seen how to make the argument vs. adjunct distinction precise in current theoretical terms).

Given this discussion, we need to reconsider Reinhart's (1995) empirical argument in favor of the noun vs. non-noun distinction in (28). Recall that according to Reinhart, *what way* in (28b) can be licensed in-situ due to its nominal status, whereas *how* in (28a) cannot, because it is not a noun. But this is not conclusive, since (28b) might contain a null preposition in the sense of Huang (1982). Under Huang's analysis, then, *what way* is an argument of the preposition as shown in (30a) while *how* is not, as shown in (30b).

(30) a. Who kissed Mary [$_{PP}$ (in) [$_{NP}$ what way]]?
b. *Who kissed Mary [in/by [how]]? (cf. Huang 1982)

In short, Reinhart's example is not conclusive in this respect. On the basis of the discussion here, we conclude that 'argumenthood' plays a crucial role for the purpose of unselective binding.

Let us turn to wh-fronting languages. Surprisingly, the interpretation of the adjunct wh-NP is clause-bound, which is confirmed on a cross-linguistic scale. This again distinguishes the adjunct wh-NP from other adjunct wh-phrases, including 'why.'

(31) a. **Warum** glaubst du daβ er so langue schlafât?
why believe you that he so long sleeps
'Why do you believe [that he sleeps so long] t?'
'Why do you believe [that he sleeps so long t]?'
b. **Was** glaubst du daβ er so langue schlafât?
what believe you that he so long sleeps
'Why do you believe [that he sleeps so long] t?'
*'Why do you believe [that he sleeps so long t]?' (German)

(32) a. **Zašto** Petar tvrdi da se Ivan pokunjio?
why Peter claims that self Ivan got-depressed
'Why does Peter claim [that Ivan is depressed] t?'
'Why does Peter claim [that Ivan is depressed t]?'
b. **Šta** Petar tvrdi da se Ivan pokunjio?
what Peter claims that self Ivan got-depressed
'Why does Peter claim [that Ivan is depressed] t?' (SC)
*'Why does Peter claim [that Ivan is depressed t]?'

The same pattern obtains when we consider English *wh-the-hell* phrases. Although the argument *wh-the-hell* phrase can undergo long-distance movement as shown in (33), the clause-bound restriction crops up with adjunct *wh-the-hell* phrases. In (34b), it is very difficult to get the reading in which *why the hell* modifies the embedded clause.[8]

(33) What the hell do you think that John bought t?

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[8] The construction with the verb *care* (see footnote 1) shows the same clause-bound restriction, as shown in (ia). This contrasts with (ib) with *why*.

(i) a. *What do you think he cares if Mary buys a new car?
b. Why do you think he cares if Mary buys a new car?

(34) a. Why do you think John is angry? (ambiguous)
b. Why the hell do you think John is angry? (matrix reading only)

At this point, we have no account of why there is such a restriction on adjunct wh-NPs in overt wh-fronting languages (and adjunct *wh-the-hell* phrases in English).[9]

4.3 Multiple Wh-Questions

Finally, we note an additional puzzle regarding adjunct wh-NPs. With the exception of Japanese, the adjunct wh-NP does not occur in multiple wh-questions.

Japanese allows the adjunct wh-NP in multiple wh-questions, as discussed by Kurafuji (1996a, b) (and our informants confirm this judgment).[10]

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[9] We cannot adopt Collins' (1991) analysis of *how come* in English, which also shares the clause-bound restriction.

(i) How come you think John bought a car? (matrix reading only)

Collins argues that *how come* occurs under C and does not undergo long-distance movement (due to the Head Movement Constraint). But this analysis does not extend to adjunct wh-NPs. For instance, in languages such as Bulgarian and Serbo-Croatian, the adjunct wh-NP occurs with an overt interrogative C.

(i) **Kakvo** li te pitom?
what C you ask-I (Bulgarian)
'Why on earth am I asking you? (why do I even bother to ask you?)'

Also, *why-the-hell* in English triggers subject-aux inversion, unlike *how come*, which shows that it is an XP, not a head.

[10] As noted by Kurafuji, the adjunct wh-NP in Japanese exhibits anti-superiority effects (on a par with *naze* 'why'). In fact, the effect seems even stronger in (ib) than in (ia).

(i) a. ?***Naze dare-ga** awateteru no?
why who-Nom panicking Q
'Who is panicking why?
b. ***Nani-o dare-ga** awateteru no?
what-Acc who-Nom panicking Q

(35) a. **Dare-ga naze** awateteru no?
who-Nom why panicking Q
'Who is panicking why?'
b. **Dare-ga nani-o** awateteru no?
who-Nom what-Acc panicking Q
'Who is panicking why?'

However, all other languages we checked disallow the adjunct wh-NP in multiple wh-questions. Note that Serbo-Croatian does not show superiority effects in simple matrix questions (see Bošković 1997), as shown in (40a-b). As (40c-d) illustrate, multiple wh-questions with the adjunct wh-NP are ungrammatical irrespective of the order of wh-phrases.

(36) a. **Koj zašto** je zamil taja kola?
who why her za-wash this car
'*Who is washing this car why?'
b. ***Koj kakvo** je zamil taja kola?
who why her za-wash this car (Bulgarian)

(37) a. (?)**Shei weisheme** qiao men?
who why knock door
'Who is knocking on the door why?
b. ***Shei** qiao **sheme** men?
who knock **what** door (Chinese)

(38) a. ?**Wer** schlaeft **warum** so lange?
who sleeps **why** so long
'*Who sleeps why so long?'
b. ***Wer** schlaeft **was** so lange?
who sleeps **what** so long (German)

(39) a. ?**Kto zachem** toropitsja?
who why hurrying
'*Who is hurrying why?
b. ***Kto chto** toropitsja?
who what hurrying (Russian)

(40) a. **Ko** se **zašto** pokunjio?
who self **why** get-depressed
'*Who is depressed why?'
b. **Zašto** se **ko** pokunjio?
why self **who** get-depressed

c. ***Ko** se **šta** pokunjio?
who self **what** get-depressed
'*Who is depressed why?'

d. ***Šta** se **ko** pokunjio?
what self **who** get-depressed (SC)

Why is Japanese exceptional? Also, why is there such a restriction in other languages? We must leave these questions open for future research.

5 Conclusion

To summarize, we claimed in this preliminary report that the adjunct wh-NP is a strongly focused wh-phrase which is base-generated as an adjunct within VP. The fact that it cannot be licensed via unselective binding shows that it is the argument vs. adjunct distinction that is crucial for unselective binding, not the noun vs. adverb distinction, as argued by Tsai (1994) and Reinhart (1995). Many questions still remain, however, and we must leave them for future studies.

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Reflexives and Constraints on the Borrowing of Discourse Function: Creoles and Tahitian French[*]

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1 Pronouns, Anaphors, and Distributional Strangeness in Creoles and Tahitian

This paper concerns some data from Tahitian French which pose potential problems for previous accounts of binding phenomena (Chomsky 1981; Reinhart & Reuland 1993). Traditional accounts seek to explain the apparent complementary distribution between pronouns and anaphors, as shown below:

(1) a. Clint Eastwood$_i$ admires himself$_{i/*j}$
b. Clint Eastwood$_i$ admires him$_{j/*i}$

In several creoles, however, anaphors and non-coreferential pronouns share both phonetic form and syntactic distribution. The following examples are ambiguous when taken out of an appropriate discourse context:

(2) i$_i$ bat li$_{j/i}$ (Seselwa)
he hit him(self)
'He hit him(self)'
(3) li$_i$ fin paṅdi li$_{j/i}$ (Mauritian Creole)
he made hang him(self)
'He hanged him(self)'
(4) a$_i$ kii en$_{j/i}$ (Saramaccan)
he kill him(self)
'He killed him(self)'

These facts are not unexpected in creoles, which do not typically exhibit the full range of morphological contrasts often observed in other languages. But, perhaps more surprisingly, similar data occur in non-creole languages as well. In this paper I will pay particular attention to the Tahitian facts, as illustrated in (5):

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(5) a. 'Ua tīahi 'oia 'iāna (Tahitian)
PST chase he PREP-him
'He$_i$ chased him$_{i/j}$'
b. 'Ua horohorōi 'oia 'iāna teie po'ipo'i
PST wash-repeatedly he PREP-him this morning
'He$_i$ washed him$_{i/j}$ this morning'

In both the creoles and Tahitian, there is also an explicitly (non)-coreferential element which is interpreted unambiguously:

(6) a. li$_i$ fin paṅdi li$_{j/i}$ (Mauritian Creole)
he made hang him(self)
'He hanged him(self)'
b. li$_i$ fin paṅdi **limem**$_{i/*j}$
he made hang himself
'He hanged himself/*him'

(7) a. 'Ua aroha 'oia 'iāna (Tahitian)
PST love he PREP-him
'He$_i$ loved him$_{i/j}$'
b. 'Ua aroha 'oia 'iāna **iho**
PST love he PREP-him self
'He$_i$ loved himself$_{i/*j}$'

Sometimes, as in Saramaccan, the unambiguous reference is non-reflexive, as shoown in (8).[1]

(8) a. a$_i$ kii en$_{j/i}$ (Saramaccan)
he kill him(self)
'He killed him(self)'
b. a$_i$ kii **hen**$_{j/*i}$
he kill him-emphatic
'He killed HIM(*self)'

Further, there are some constructions in Tahitian which are inherently reflexive; when added to these constructions, the explicitly reflexive element **iho** yields another ambiguity:

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[1] I am not aware of other languages which pattern like Saramaccan with respect to this data. It is difficult to say why the preponderance of languages with only one unambiguous referential form use that form to designate reflexivity.

(9) a. 'Ua mutu 'oia ('i te tipi)
PST break-off he (with a knife)
'He$_i$ cut himself$_{i/*j}$ with a knife.'
b. 'Ua mutu 'oia **iho** ('i te tipi)
PST break-off he self (with a knife)
i. 'He HIMSELF cut himself (with a knife). (No one else was responsible.)' or
ii. 'He cut HIMSELF (with a knife). (No one else was cut.)'

Tahitian French shows a similar ambiguity which is not present in Standard or Canadian French. Standard French permits the first gloss of (10,11b) but not the second; as illustrated below, Tahitian French allows both:

(10) a. Nous nous sommes mariés
We us are married
'We married each other'
b. Nous nous sommes mariés nous-mêmes
We us are married ourselves
i. 'We married each other ourselves (we performed our own marriage ceremony)' or
ii. 'We married EACH OTHER (and no one else; we are not polygamists)'

(11) a. Je me suis brossée les dents
I me am brushed the teeth
'I brushed my teeth'
b. Je me suis brossée les dents moi-même
I me am brushed the teeth myself
i. 'I brushed my teeth myself (no one else was responsible)' or
ii. 'I brushed my own teeth (and no one else's)'

My eventual goal is to reconcile the above facts with some version of the binding theory. To this end, the remainder of this paper is organized as follows. I will begin with a brief reminder of the binding proposals put forth by Chomsky (1981) and the more recent account by Reinhart & Reuland (1993). I will suggest a way to extend the version of the binding theory defended by Reinhart & Reuland to account for the Tahitian and creole facts; the minor modification of their story which is required draws from corroborating evidence from Kannada reported in Lidz (1998). Finally, I will discuss the Tahitian French data in greater detail and ultimately I will suggest that the facts follow from the modified account of Reinhart & Reuland plus a Tahitian French information packaging mechanism which is inherited directly from Tahitian. In the spirit of Prince (1992), this view has consequences for the borrowing of discourse function across linguistic boundaries more generally.

2 Binding Theory: Syntactic Accounts

The standard formulation of the binding conditions entails strict complementarity between pronouns and anaphors, as the relevant conditions (A and B) are the strict mirror image of one another (Chomsky 1981):

(12) a. *Condition A:* An anaphor is free in its governing category.
  b. *Condition B:* A pronoun is free in its governing category.

These conditions as stated above are adequate to cover many contexts where a pronoun is disallowed in an environment permitting an anaphor and vice versa:

(13) a. David$_i$ criticized himself$_i$/*him$_i$.
  b. David$_i$ talks to himself$_i$/*him$_i$.
  c. David$_i$ said he$_i$/*himself$_i$ would be there.

However, as Reinhart & Reuland (among others) note, there are well-known contexts where this complementarity breaks down, most notably with adjuncts and NP anaphora. The following examples allow the use of either an anaphor or a pronoun:

(14) a. Stella$_i$ saw a snake near her$_i$/herself$_i$.
  b. I$_i$ counted seven criminals in the room apart from me$_i$/myself$_i$.

(15) a. Dominic$_i$ saw a picture of himself$_i$/him$_i$ hanging in the hall.
  b. Dominic$_i$ tells jokes about himself$_i$/him$_i$ to entertain his guests.

Noting these problems with the standard account, Reinhart & Reuland (1993) (henceforth R&R) propose a binding theory of their own. I will briefly sketch their account here; for further detail the reader is advised to check Reinhart & Reuland (1993) and the references therein.

R&R crucially distinguish between a *reflexive semantic predicate* and a *reflexively-marked syntactic predicate*. A semantic predicate is reflexive if and only of two of its arguments are co-indexed; a syntactic predicate P is reflexive-marked if and only if either P is lexically reflexive or one of P's arguments is a SELF-anaphor. Let's see a few examples to make the terms more clear:

(16) a. John$_i$ likes himself$_i$
b. semantic predicate: likes(j, j) → reflexive
c. syntactic predicate: SELF-anaphor → reflexive-marked

(17) a. *Meredith$_i$ hugged her$_i$
b. semantic predicate: hugged(m, m) → reflexive
c. syntactic predicate: no SELF-anaphor; verbal complex is not lexically reflexive → not reflexive-marked

(18) a. Raffles$_i$ kidnapped him$_j$
b. semantic predicate: kidnapped(r, j) → not reflexive
c. syntactic predicate: no SELF-anaphor; verbal complex is not lexically reflexive → not reflexive-marked

(19) a. *I$_i$ knew himself$_j$
b. semantic predicate: knew(i, j) → not reflexive
c. syntactic predicate: SELF-anaphor → reflexive-marked

In English, reflexive-marking is typically accomplished via the presence of a SELF-anaphor, but this need not be the case. Romance languages, for instance, frequently express reflexive-marking via a lexically reflexive predicate (i.e. a verbal complex which is explicitly marked as reflexive).

R&R take advantage of the distinction between semantic and syntactic predicates in redefining Binding Conditions A and B:

(20) a. *Condition A*: A reflexive-marked syntactic predicate has to be reflexive.
b. *Condition B:* A reflexive semantic predicate has to be reflexive-marked.

These are understood as conditional statements, abbreviated as above for reasons of perspicuity.

These conditions apply to the above examples as follows: (16) is both reflexive and reflexive-marked, so both conditions are satisfied. (17) is reflexive but not reflexive-marked; hence, Condition B is violated. (18) is neither reflexive nor reflexive-marked, so the binding conditions do not apply (the antecedents of the conditions are false). Finally, (19) is reflexive-marked but not reflexive; hence, Condition A is violated.

3 Problematic Data

The creole and Tahitian data presented in the first section of this paper is problematic for any account couched in overt syntactic distribution. And the data presented is hardly anomalous; similar facts are seen in Spanish- and Portuguese-based creoles in addition to the French-based creoles shown above. Descriptively, the problem is clear: in Tahitian and the creole languages described, there is one morphologically neutral form which is ambiguous. One subset of these languages contains an additional form which is explicitly marked as reflexive (illustrated in (6-7) above). Another subset of these languages has, in addition to the morphologically neutral ambiguous form, a separate emphatic form which forces a non-reflexive interpretation (shown in (8) above).[2]

On the surface the morphologically neutral ambiguous data is problematic for both Chomsky (1981) and R&R (1993), and indeed, for any account couched in overt syntactic distribution. If there is no way to distinguish between reflexive and non-coreferential pronominal forms in the surface syntax – that is, if they share identical syntactic distributions and phonetic realizations – how do we instantiate Conditions A and B? Clearly some theory of use must account for speakers' ability to differentiate between the pronominal and the reflexive forms, but this theory of use has no place in the syntax per se. Further, how do we account for data from Saramaccan and similar creoles, in which it is not reflexivity which is marked at all but rather something like unreflexivity?

3.1 Reflexive-marking?

To sum, the creole data is at first blush highly problematic for Chomsky (1981) and Reinhart & Reuland (1993) in the following respect: it is difficult to see how one might give a syntactic account of the difference between reflexive anaphors and non-coreferential pronouns when there seems to be a difference in neither their syntactic distribution nor the phonetic realization of the predicates containing them. R&R's account depends crucially on the notion of reflexive-marking, but as we have seen, reflexives are not overtly marked in the creole data.

However, we would clearly like to maintain the distinction between reflexive anaphors and non-coreferential pronouns; despite the fact that they appear identical in the surface syntax (ignoring for the moment the non-ambiguous cases which are identifiably reflexive or non-reflexive, shown in (6-8)), reflexives and non-coreferential pronouns clearly mean different things. As far as

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[2] The account presented here does not rule out the possible existence of a language containing both explicit forms in addition to the morphologically neutral ambiguous form, although at present the author does not know of a language exhibiting the relevant data.

I can tell, there are two major avenues one might pursue in accounting for this data. First, one might try to claim that the different 'meanings' in fact merely correspond to different pragmatic uses. If we follow this path, we are committed to the position that there is no *ambiguity* per se; that is, there is no ambiguity represented in the syntax or semantics at any level of abstraction. Intuitively, this option is unappealing, because we certainly don't wish to advance the same claim about other languages which overtly differentiate between reflexives and non-reflexive pronominals, and we would like our account to be as cross-linguistically far-reaching as possible.

Alternatively, we might claim that the difference between the two, though *driven* by a theory of use, is not strictly due to it. That is, the theory of use allows for the choice between distinct syntactic options, and the difference in meaning is somehow represented in the syntactic representation. As it allows us to preserve what is good about R&R's analysis, and as it allows for wider-reaching cross-linguistic claims than the first path sketched above, this is the avenue I will pursue here.

We know that reflexive-marking may be accomplished in two ways, via the presence of a SELF-anaphor or through lexical reflexivity, whereby a predicate is marked with the reflexive property. If we assume that reflexive-marking is present in the overt syntax (as either a SELF-anaphor or a verbal complex of the appropriate morphological type), the creole data appears troublesome as follows: Condition B is never met, and Condition A never applies. But let's suppose instead that reflexive-marking does not have to be present in the overt syntax, but rather reflexive-marking may occur via some null operator. Creoles are on the whole morphologically simplified; when the operator applies, the syntactic predicate is reflexive-marked with no phonetic reflex. That is, the marking is not present in the overt syntax even where it has applied due to the morphological restrictions typically imposed by creole grammars.

4 Not All Markers are Created Equal

The two instantiations of reflexive-marking are treated as semantic equivalents in the R&R framework; however reflexive-marking is achieved, it must correspond to semantic reflexivity. Because binding theory applies at LF, all reflexive predicates have the same LF interpretation. Lidz (1998) reports data from Kannada which cast considerable doubt on this supposed equivalence. Kannada represents lexical reflexivity morphologically, with an overt verbal affix. In Kannada, the anaphor *tannu* cannot be bound by a coargument in the absence of the verbal reflexive morpheme *-koL* (*-koND* in the past tense).

(21) a. *Hari tann-annu hoDe-d-a (Kannada)
Hari self-ACC hit-PST-3.sg.m
'Hari hit himself'
b. Hari tann-annu hoDe-du-koND-a
Hari self-ACC hit-PP-REFL.PST.3.sg.m
'Hari hit himself'

Kannada also has a morphologically complex anaphor which can occur in the absence of the verbal reflexive:

(22) Hari tann-annu-taane hoDe-d-a
Hari self-ACC-self hit-PST-3.sg.m
'Hari hit himself.'

Thus, lexical reflexivity is morphologically represented by an affix on the verb, while syntactic reflexivity is marked with a morphologically complex SELF-anaphor. Kannada not only provides evidence of distinct morphological realizations of the two types of marking; there is also evidence of differences in their meaning:

(23) a. Hari tann-annu nod-i-koND-a
Hari self-ACC see-PP-REFL-PST-3.sg.m
'Hari saw himself (=own self)'
b. Hari tann-annu-tanne nod-id-a
Hari self-ACC-self see-PST-3.sg.m
'Hari saw himself (=statue or own self)'

The first example above licenses only the interpretation where Hari is seeing his literal self (say, in a mirror), while the second is felicitously uttered when Hari walks past Madame Tussaud's and catches sight of a statue of himself in the window. Using this data, Lidz suggests the following distinction:

(24) a. *(Semantic/Pure-reflexive):* $\lambda x\ [P(x,x)]$
b. *(Near-reflexive):* $\lambda x\ [P(x, f(x))]$

The Pure-reflexive is represented by a function which maps an object to the object itself; the Near-reflexive maps an object to some appropriate representation of that object. Clearly, then, all interpretations permitted by a felicitous use of the Pure-reflexive are also licensed by a felicitous use of the Near-reflexive (but not vice versa). In Kannada, the use of the morphologically complex SELF-anaphor permits both Near-reflexive interpretations, while lexical reflexivity denotes Pure-reflexivity.

But Tahitian has neither the morphological affix of Kannada to designate lexical reflexivity, nor the simplex-complex anaphor distinction; there is only one explicit anaphor, *iho*. But if we assume, as suggested above, that lexical reflexivity may apply via some null operator, the picture clarifies. In Tahitian, like Kannada, the two kinds of reflexive-marking also differ with respect to the availability of Near- and Pure-reflexive readings. However, unlike Kannada, lexical reflexives allow both readings, while syntactic reflexivity permits only the Pure-reflexive interpretation:

(25) a. 'Ua 'ite 'oia 'iāna
PST see he PREP-him
'He saw himself (=statue or self)'
b. 'Ua 'ite 'oia iho 'iāna
PST see he self PREP-him
'He himself saw himself (=statue or self)'
c. 'Ua 'ite 'oia 'iāna iho
PST see he PREP-him self
'He saw HIMSELF (=self)'

The pairing of morphological type of reflexive-marker with semantic type of reflexivity does not appear to be cross-linguistically straightforward. What is crucial here, however, is that in light of this data, R&R cannot assume that all types of reflexive-marking are created semantically equal.

5 Borrowing of Discourse Function across Linguistic Boundaries

Recall the following data:

(26) a. 'Ua aroha 'oia 'iāna
PST love he PREP-him
'He$_i$ loved him$_{i/j}$'
b. 'Ua aroha 'oia 'iāna iho
PST love he PREP-him self
'He$_i$ loved himself$_{i/*j}$'

(27) a. 'Ua hahu vau iho 'iāna
PST shave I self him
'I myself shaved him'

b. 'Ua hahu vau 'iāna iho
PST shave I him self
'I shaved HIM'
c. 'Ua hahu vau iho
PST shave I self
'I MYSELF shaved (myself) (i.e. No one else was responsible)' or
'I shaved MYSELF (i.e. No one else was shaved)'

Note that *iho* serves an emphatic pronoun function in non-reflexive contexts:

(28) a. Te ha'api'i nei Si'one i e ta'ata mana
PRES teach here-now John to a man powerful
'John teaches a powerful man'
b. Te ha'api'i nei Si'one iho i e ta'ata mana
PRES teach here-now John self to a man powerful
'John himself teaches a powerful man'

(29) a. 'Ua ite au 'iāna
PST know I PREP-him
'I knew him'
b. 'Ua ite au iho 'iāna
PST know I self PREP-him
'I myself knew him'
c. 'Ua ite au 'iāna iho
PST know I PREP-him self
'I knew him himself,' i.e. 'I knew HIM'

These apparently mystifying facts are in fact quite easily explained in light of the standard emphatic use of *iho*. Since *iho* may be added to either subject or object in the non-reflexive case, I assume that the ambiguity illustrated in (numberc) is related to the fact that the object may be suppressed on the inherent reflexive interpretation. That is, *iho* is where it always is. Given that it follows the subject, the agent-emphasis reading is available as usual. However, if the object were present, it would intervene between the subject and *iho*. And in fact the object may be present, even on a reflexive reading:

(30) 'Ua hahu 'oia 'iāna iho
PST shave he PREP-him self
'He shaved HIMSELF'

Standard French allows both reflexive-marking 'slots' to be filled overtly, but to only one semantic effect:

(31) Nous nous sommes mariés nous-mêmes
We us are married ourselves
a. 'We married each other ourselves (we performed our own marriage ceremony).'
b. *'We married EACH OTHER (emphatic).'

Tahitian French permits both interpretations of (31), but its surface syntax is identical to that of Standard French. That is, the two reflexive-marking operators can potentially apply overtly (i.e. they are morphologically realized) in both Standard French and Tahitian French. Tahitian French then retains the syntax of Standard French – in which both types of reflexive-marking may appear in the overt syntax – but takes (a crucial aspect of) the information structure of Tahitian: where Tahitian displays ambiguity in the use of the SELF-anaphor, so does Tahitian French.

This is consistent with the claims put forth by Prince (1992) with respect to constructions and the borrowing of discourse function in language contact situations. The speaker of Tahitian learning French has at her disposal an overtly reflexive SELF-anaphor which can be used for two informational purposes: agentivity or emphasis, as discussed above. She hears an overt SELF-anaphor in French, which she takes to be the same (or highly similar). In all cases where she hears this SELF-anaphor, it is being used agentively. That is, the evidence she hears is entirely consistent with her own pattern of use in Tahitian, as she too can use SELF-anaphors agentively. The Tahitian learner of French then extends the perceived parallelism and uses the French SELF-anaphor as she would use the apparently comparable element in Tahitian – that is, she will use the French SELF-anaphor not only to convey its canonical agentive function, but also to express the emphatic function common to the similar SELF-anaphor in Tahitian.

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Two Types of Verb Particle Constructions[*]

Mikael Vinka

1 Introduction

Swedish Verb Particle Constructions (VPCs) are often claimed to be constrained in such a way that the particle must precede the object (Taraldsen 1991, Holmberg & Platzack 1995, Svenonius 1996 etc.). Therefore, (1a) and (2a) are well formed, whereas (1b) and (2b) are ill formed.

(1) a Kalle satte **på** *TVn*. V **Prt** *Obj*
Kalle switched **on** *TV.the*
'Kalle switched on the TV.'
b *Kalle satte *TVn* **på**. *V *Obj* **Prt**
Kalle switched *TV.the* **on**
'Kalle switched the TV on.'
(2) a Kalle smutsade **ner** *tröjan* V **Prt** *Obj*
Kalle dirtied **down** *shirt.the*
'Kalle made the shirt dirty.'
b *Kalle smutsade *tröjan* **ner** *V *Obj* **Prt**
Kalle dirtied *shirt.the* **down**
'Kalle made the shirt dirty.'

However, closer examination reveals that (1) and (2) differ in various fine points of syntactic distribution. In (3) and (4) the full DP objects of (1) and (2) are replaced with pronouns. In contrast to (1b), (3b) is well formed, even though the object precedes the particle. However, (4b) is just as bad as (2b).

(3) a Kalle satte **på** *den*. (cf. 1a) V Prt Pron
Kalle switched **on** *it*
'Kalle switched on it.'
b Kalle satte *den* **på**. (cf. 1b) V Pron Prt
Kalle switched *it* **on**
'Kalle switched it on.'

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(4) a Kalle smutsade **ner** *den*. (cf. 2a) V Prt Pron
Kalle dirtied **down** *it*
'Kalle made it dirty.'
b *Kalle smutsade *den* **ner** (cf. 2b) *V Pron Prt
Kalle dirtied *it* **down**
'Kalle made it dirty.'

Notice that the particle in (1) and (3) denotes a resulting state, while the particle in (2) and (4) does not. This distinction is also manifested by the fact that the particle in (1) and (3) can occur in a copula construction like (5), while the particle in (2) and (4) can not, as seen in (6). That is, (6) can not mean that the shirt is dirty. On the basis of this contrast, I will call the particle in (1) **predicative**, and the particle in (2) **non-predicative.**[1]

(5) TVn är **på**. Predicative
TV.the is **on**
'The TV is on.'
(6) *Tröjan är **ner**. Non-Predicative
shirt.the is **down**
≠ 'The shirt is dirty'

Analytic passives provides another point of contrast. In this type of passive, a predicative particle can occur postverbally, (7). A non-predicative particle, however, cannot, as (8a) illustrates. Instead, a non-predicative particle must appear as a prefix on the passivized verb, (8b):[2]

(7) TVn blev satt **på**. Predicative
TV.the became switched **on**
'The TV was switched on.'
(8) a *Tröjan blev smutsad **ner**. Non-Predicative
shirt.the became dirtied **down**.
'The shirt was made dirty.'
b Tröjan blev **ner**-smutsad. Non-Predicative
shirt.the became **down**-dirtied
'The shirt was made dirty.'

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[1] A similar distinction was made for English in Aarts (1989) and Zoerner (1996), and more recently for German in Wurmbrand (1998). See also the descriptive works by Bolinger (1971), Fraser (1976) and Gleitman (1965).

[2] Also speakers that do not readily accept (3b) and (7), nevertheless agree that those sentences are much better than (4b) and (8a). Thanks to J. Bobaljik for further confirming this fact with Anders Holmberg and Ida Toivonen.

In short, a D-structure object can occur in an A-position to the left of a free standing particle, iff the particle is predicative. This restriction holds in active sentences, (3) and (4), as well as in passive sentences, (7) and (8).[3]

So far we have seen that different particles have different properties. However, depending on what type of particle we are dealing with, also the verbs that go along them have different properties. Consider (9). When the particle is predicative, the main verb can often be replaced by the light verb ha 'have', without changing the basic interpretation of the sentence. Both (9a) and (9b) mean that Kalle caused the TV to become on. However, a light verb may never occur in a non-predicative construction, as shown in (10). That is, (10b) does not describe an event where a shirt is made dirty.

(9) *Predicative Construction*:
a Kalle **satte** på TVn.
Kalle **switched** on TV.the
'Kalle switched on the TV.'
b Kalle **hade** på TVn. Light Verb Substitution OK
Kalle **had** on TV.the
'Kalle switched on the TV.'
(10) *Non-Predicative Construction*:
a Kalle **smutsade** ner tröjan.
Kalle **dirtied** down shirt.the
'Kalle made the shirt dirty.'
b *Kalle **hade** ner tröjan. *Light Verb Substitution
Kalle **had** down shirt.the
≠ 'Kalle made the shirt dirty.'

This paper argues for a structural distinction between predicative and non-predicative VPCs, based on a proposal by Baker (1997), shown in (11). Baker argues that the lower VP in a layered VP should be decomposed into a VP and a property denoting argument of V, Prop(erty)P.[4] According to Baker, all verbs start out as heads of the property denoting argument. Notice that the lower V corresponds to a lexical operator BE or BECOME.

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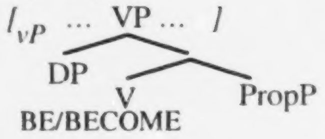
[3] We will set aside the issue why the word order V-Obj-Prt in active clauses is restricted to cases where Obj=pronoun.

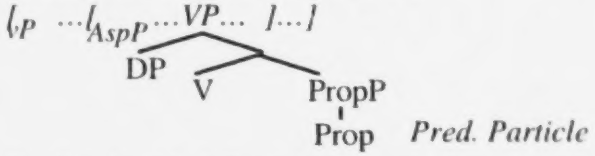
[4] Baker (1997) claims that the property denoting argument is an AP. However, I refer to this argument as PropP, hence making no claim concerning its category name.

(11) Baker (1997):

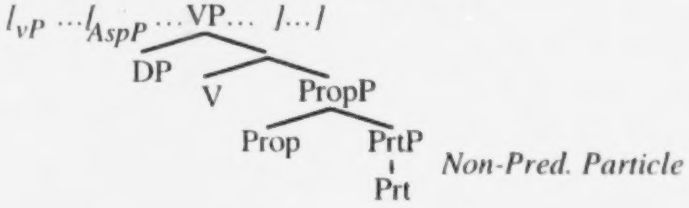


This paper proposes that a predicative particle corresponds to the PropP, as in (12). Non-predicative particle, on the other hand, will be analyzed as complements of Prop, as shown in (13).[5] These structural differences along with language specific properties of the Aspect Phrases in (12) and (13) provide the basis for our analysis.

(12) Predicative Verb Particle Construction



(13) Non-Predicative Verb Particle Construction



The paper is organized as follows. Section 2 deals with the phenomenon of light verb substitution. Section 3 discusses active VPCs and in section 4, we treat passivized VPCs. Section 5 concludes the paper.

2 The Verb in Verb Particle Constructions

The verb in predicative VPCs can fluctuate between various manner-oriented verbs and the light verb ha 'have', without affecting the meaning of the basic event.

(14) a Kalle knäppte på radion.
Kalle flipped on radio.the
'Kalle switched on the radio by flipping the on/off button.'

---

[5] We leave the question open what the exact categorial status of PrtP is.

b Kalle vred på radion.
Kalle twisted on radio.the
'Kalle switched on the radio by twisting the on/off button.'
c Kalle hade på radion.
Kalle had on radio.the
'Kalle switched on the radio.'

In their discussion of resultative constructions, Levin & Rapoport (1988) introduced Lexical Subordination (LexSub), which "takes a verb in its original, basic, sense and subordinates it under a lexical predicate" (ibid:282). Hence, a resultative sentence like (15a) derives its meaning from the LCS (15b):

(15) a Jag målade huset rött.
I painted house.the red
'I painted the house red.'
b [x CAUSE [y BECOME 'red'] by [x 'paint' y]]

Levin & Rappaport (1995) reject (15b) by pointing out that the verb måla 'paint' is expected to behave differently depending on whether it occurs in a resultative construction or not. However, the different LCSs stipulated for (15) and (16) have no such effects; both express events of house-painting.

(16) a Jag målade huset.
I painted house.the
'I painted the house.'
b [x CAUSE [y BECOME 'painted']]

While the absence of a resultative adjective may have consequences for the telicity of an event, the omission of a predicative particle has a deeper impact on interpretation. Consider the pair of sentences in (17), both of which involve the main verb vrida 'twist/turn'. (17a) means that Kalle caused the radio to become on. (17b), however, can only mean that Kalle turned the radio so that it faced another direction. Hence (17a) and (17b) do not express the same basic event.

(17) a Kalle vred på radion.
Kalle twisted on radio.the
'Kalle switched on the radio by twisting the on/off button.'
b Kalle vred radion.
Kalle twisted radio.the
'Kalle turned the radio.' (≠(17a))

Another difference between resultative constructions like (15) and predicative VPCs like (17a), is that the verb in (15) can not be replaced by a light verb, as shown in (18), which is mere gibberish.

(18) *Jag hade huset rött.
I had house.the. red
'I had the house red.'

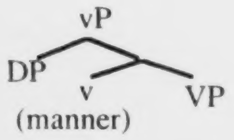
The failure of light verb substitution in (18) further supports Levin & Rappaport's (1995) criticism of LexSub for resultatives. However, LexSub yields the right results for predicative VPCs.

Let us reconsider the sentences in (14) in the light of LexSub, as illustrated in (19). The basic meaning is determined by the lexical operators in combination with their arguments. In (19a), we find a subordination specified for flipping or twisting, hence corresponding to examples (14a) and (14b). If no manner is specified, (19c), then CAUSE is spelled out simply as a light verb, (14c).

(19) a [x CAUSE [y BECOME 'on'] by [x 'flipping/twisting' y]]
b [x CAUSE [y BECOME 'on']]

We can take (19) one step further by following Hale & Keyser (1993), who proposed that the higher v in a layered VP-structure may be associated with a manner tag, which gives us the representation in (20). Let us now assume that the manner tag in (20) is equivalent to the subordination in (19a). That is, the manner tag is subordinated under the upper v, whose semantic content is closely related to the lexical semantic operator CAUSE. As a consequence, the lexical verb in a predicative VPC is generated in the upper, parallel to what the LCSs in (19) above illustrates. And again, if no manner is specified in (20), the upper v will be spelled out as a light verb.

(20)

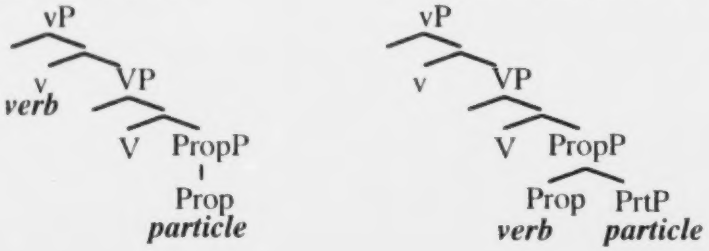


If verb replacement is a reliable diagnostic for LexSub, then we conclude that non-predicative VPCs have a different representation than predicative VPCs. In this sense non-predicative VPCs resemble resultative constructions. The verb in a non-predicative VPC can not be replaced by another verb, whether it be a lexical verb, (21b), or a light verb, (21c).

(21) a Kalle plattade till metallen.
Kalle flattened to metal.the
'Kalle flattened the metal.'
b *Kalle slog till metallen
Kalle hit to metal.the
* 'Kalle flattened the metal by hitting.'
c *Kalle hade till metallen.
Kalle had to metal.the
* 'Kalle flattened the metal.'

We accommodate these findings into a verb phrase based on Baker (1997) in the following way. To begin with, notice that in a predicative VPC, the particle itself carries a heavy semantic burden, since it denotes the resulting state of the whole event. As shown in the LCS (19a), the particle is the property denoting argument of BECOME, which means that the particle corresponds to the head of the PropP in (22a), while the verb originates high up. In a non-predicative VPC such as (21), it is the verb rather than the particle that denotes the property that the object is related to. Thus, the verb in a non-predicative VPC does the same job as the particle in a predicative VPC. Therefore, let us assume that the verb in a non-predicative VPC originates in the head of PropP, as shown in (22b).

(22) a Predicative VPC b Non-Predicative VPC



In this section we have examined the properties of the verbs in Swedish VPCs. We have argued that the verb in predicative VPCs is in effect a light verb that is generated in the upper v. The verb in a non-predicative VPC, however, originates down low in the VP.

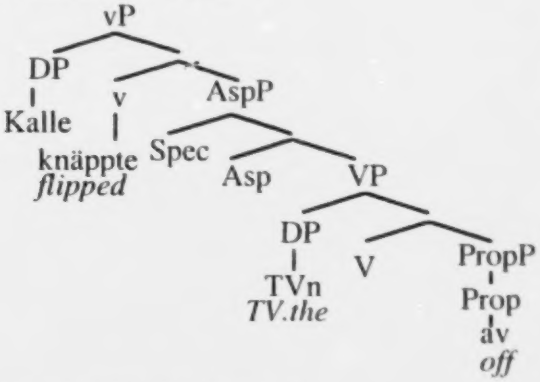
3 The Structures of VPCs and Word Orders in Active Clauses

This section discusses word order possibilities in active clauses with pronominal objects. Such an object may occur on either side of predicative particle, (23), while it must follow a non-predicative particle, (24):

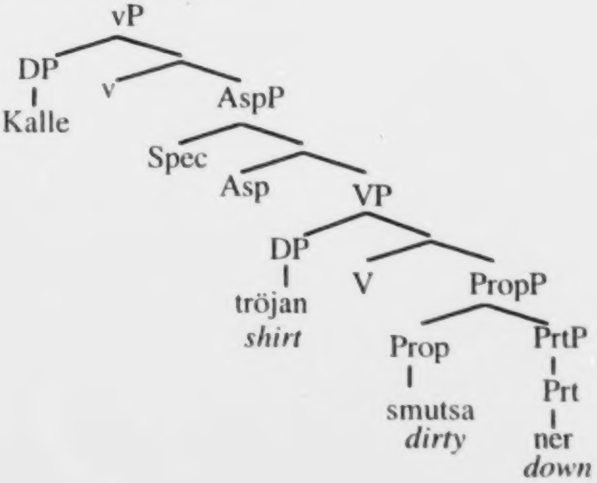
(23) Kalle sparkade (*den*) **sönder** (*den*). Predicative
Kalle kicked (*it*) **broken** (*it*)
'Kalle broke it, by kicking it.'
(24) Lisa plattade (**den*) **till** (*den*). Non-Predicative
Lisa flattened (*it*) **to** (*it*)
'Lisa flattened it.'

The structures of predicative and non-predicative VPCs are given in (25a) and (25b) respectively, ignoring higher functional projections:

(25) a *Predicative Particle*


vP
DP
Kalle
v
knäppte
flipped
AspP
Spec
Asp
VP
DP
TVn
TV.the
V
PropP
Prop
av
off

b *Non-Predicative Particle*


vP
DP
Kalle
v
AspP
Spec
Asp
VP
DP
tröjan
shirt
V
PropP
Prop
smutsa
dirty
PrtP
Prt
ner
down

Consider the Aspect Phrase (Travis 1991) that intervenes between the two verbal projections. Tenny (1994: 148) notes that "The class of verb particles have the semantic property of imposing delimtedness on the event described by a verb phrase." Since particles are intimately related to aspect, I propose in the spirit of Travis (1991) that a particle must raise into AspP to check an aspectual feature of Asp°, as stated in (26a). We also assume that this feature is strong in Swedish, (26b).

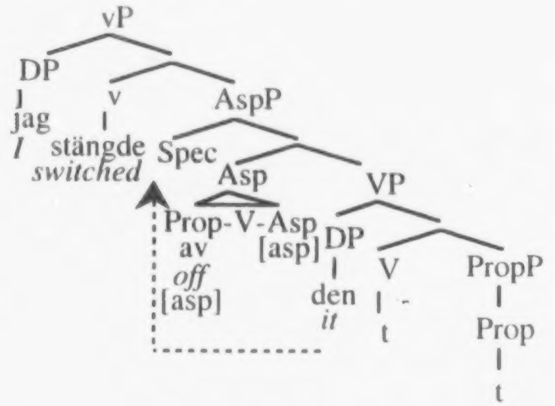
(26) a The feature [aspect] of Asp° is checked by a particle.
b The feature [aspect] of Asp° in Swedish is strong.

We shall now see how these assumptions can capture the properties of Swedish VPCs. Let us begin with a predicative VPC like (27), whose partial derivation is given in (28).

(27) Jag stängde (den) av (den).
I switched it off it
'I switched it off.'

I assume that the particle, i.e. Prop°, and the lower V conflates (Baker 1997:19) via head-movement (Hale & Keyser 1993:53-4). The complex lower V now raises into the head of Aspect. Notice that the particle is in a legitimate checking configuration with Asp°, hence the strong aspectual feature of Asp° is checked. Furthermore, since the particle in (28) is found in the head of Aspect, the pronominal object may optionally move into the Specifier of the Aspect Phrase, as indicated by the dotted arrow, perhaps to check case, or some other feature. This is in accordance with the definition of Attract, given in (29). Hence the pronominal object in can occur on either side of a predicative particle.

(28)



(29) ATTRACT F (Chomsky 1995:297)
K attracts F if F is the closest feature that can enter into a checking relation with a sublabel of K.

Let us now turn to a non-predicative VPC like (30).

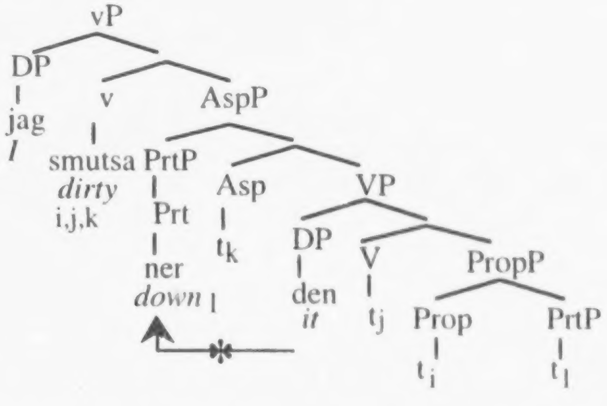
(30) Jag smutsade (*den) ner (den).
I dirtied it down it
'I made it dirty.'

Consider the partial derivation in (32). The root 'dirty' originates in the head of PropP and the Particle Phrase is the sister of Prop. Again, Prop° conflates with V, whereupon the complex V raises into Asp°. However, Asp° has a strong aspectual feature that requires checking. The particle can not head-move into the Aspect phrase across the intervening heads in (32), as a consequence of the Head Movement Constraint (Travis 1984). It is also important to pay attention to the definition of Closeness, (31):

(31) CLOSENESS (Chomsky 1995: 356)
If β c-commands α and τ is the target of raising, then β is
closer to K than α unless β is in the same minimal domain as
(a) τ or (b) α.

Since the object lacks a aspectual feature, it will not prevent PrtP from being attracted by Asp°, so PrtP now XP-moves into SpecAspP. The particle phrase is now in a Spec-Head relation with Asp°, and consequently checking obtains. Since the Spec of Aspect is filled, it follows that the pronominal object can not target this position. And therefore we get a fixed word order in Non-Predicative constructions.

(31)



In this section, I have argued that Predicative and Non-Predicative VPCs are structurally distinct. The structural differences along with the strong aspectual feature of the Aspect Phrase captures the asymmetric behavior of the two particle types.

4 Passivized Verb Particle Constructions

We will now turn to the formation of analytic passives. Recall that a Non-Predicative particle may never be separated from the verb in passives, but must surface as a prefix, (33).

(33) a *Mjölken blev drucken **upp**.
milk.the became drunk **up**
'The milk was drunk up.'
b Mjölken blev **upp**-drucken.
milk.the became **up**-drunk
'The milk was drunk up.'
c *Tröjan blev smutsad **ner**.
shirt.the became dirtied **down**
'The shirt was made dirty.'
d Tröjan blev **ner**-smutsad.
shirt.the became down-dirtied
'The shirt was made dirty.'

Predicative particles, however, can be separated from the verb, as shown in (34a). They may also be prefixed, as in (34b), but I set these aside. What important is that prefixation is NOT obligatory.

(34) a Radion blev satt **på**.
radio.the became switched **on**
'The radio was switched on.'
b Radion blev **på**-satt
radio.the became **on**-switched
'The radio was switched on.'

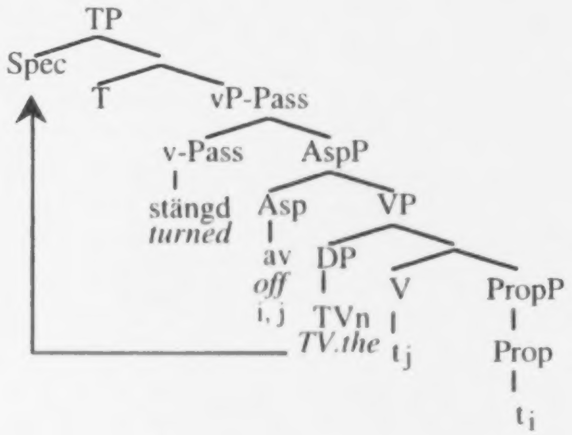
In both analytic passives and active clauses with pronominal objects, it is possible for the object in a predicative VPC to occur in an A-position to the left of a free standing particle. But if the particle is non-predicative, then this is impossible. This fact suggests that the account given in the previous section should carry over to passives as well.

Consider a passivized predicative VPC, like the one in (35), whose partial derivation is given in (36):

(35) TVn blev stängd **av**.
TV.the became switched **off**
'The TV was switched off.'

In (36), the particle conflates with V and head-moves into Asp°, checking off the strong aspectual feature. Now, in accordance with Attract and Closeness, the object can be attracted by the strong EPP feature of T.

(36)

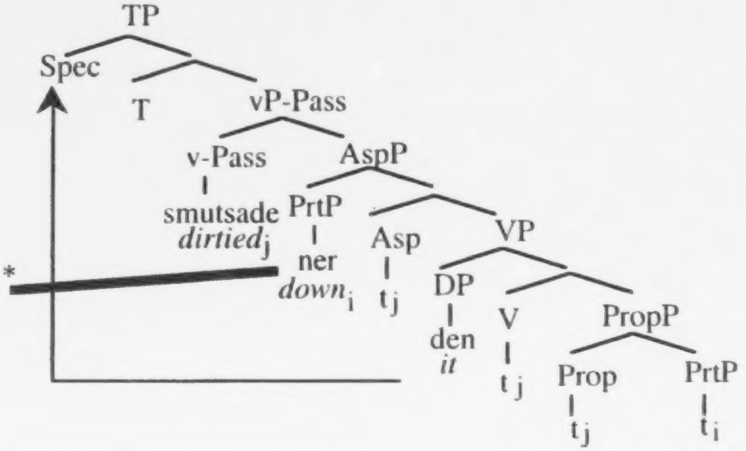


But what about a passivized non-predicative construction like (37)?

(37) *Tröjan blev smutsad **ner**.
shirt.the became dirtied **down**
'The shirt was made dirty.'

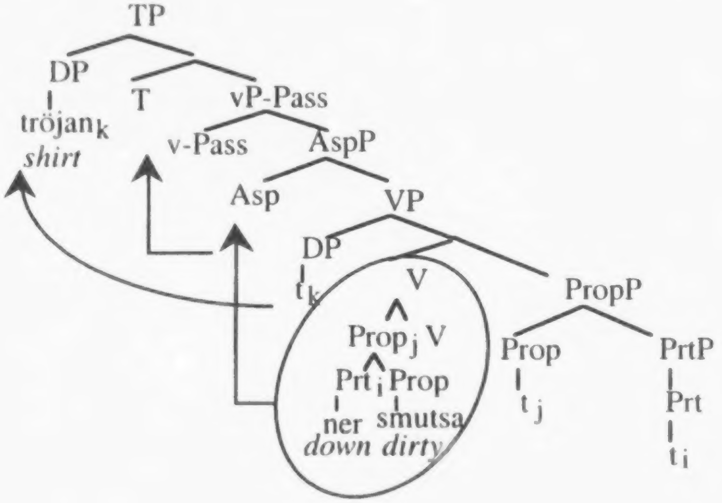
AspP has a strong aspectual feature in Swedish, which forces the particle to move overtly into SpecAspP, (38). But we wish to say that (38) is bad since the particle is in SpecAspP. Collins (1997) speculates that the EPP feature of T might have the property that it can attract essentially any categorial feature. If this is correct, then the particle in SpecAspP in (38), counts as closest for the purposes of Attract, hence preventing the theme from raising into the matrix subject position. Moreover, we may assume along the lines of McGinnis (1998), that although the non-predicative particle in (38) can block movement, it itself lacks the right features for satisfying the EPP.

(38)


TP
Spec
T
vP-Pass
v-Pass
smutsade
dirtied$_j$
AspP
PrtP
ner
down$_i$
Asp
t$_j$
*
VP
DP
den
it
V
t$_j$
PropP
Prop
t$_j$
PrtP
t$_i$

We can now provide an account why non-predicative VPCs in Swedish require the particle to surface as prefix. Since the aspectual feature is strong, it must be checked before the application of Spell-Out. But if the particle raises into SpecAspP, then it blocks movement of the theme into the subject position, and the derivation crashes. This is the situation in (38). The situation can be resolved if the particle incorporates into the head Prop°, as in (39). The complex Prop conflates with the lower V whereupon it raises into Asp°. Now the particle and Asp° are in a head-head configuration, which enables checking of the feature. Moreover, now the strong EPP feature of T can attract the object, which counts as closest for the purposes of Attract.

(39)


TP
DP
tröjan$_k$
shirt
T
vP-Pass
v-Pass
AspP
Asp
VP
DP
t$_k$
V
Prop$_j$ V
Prt$_i$ Prop
ner
down
smutsa
dirty
PropP
Prop
t$_j$
PrtP
Prt
t$_i$

In this section I have claimed that free standing predicative particles can occur in analytic passives, since they do not interfere with A-movement of the object. On the other hand, a free standing Non-Predicative particles does interfere with A-movement of the D-structure object, and therefore the particle must undergo head-movement in the formation of analytical passives, thus surfacing as prefixes.[6]

5 Concluding Remarks

This paper has shown that there is good empirical motivation that at least two types of VPCs must be recognized, namely predicative and non-predicative VPCs. In this paper we have concentrated on two types of evidence. On the one hand, it has been shown that the verbs in different VPCs have different properties. On the other hand, we have also been concerned with the effects particles may have on A-movement of objects. In particular, predicative particles are transparent to A-movement in Swedish. Non-predicative particles, however, have the capacity to block A-movement.

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---

[6] A residual problem is found in morphological, so called s-passives, where both predicative and non-predicative particles can be separated from the verb:

(i) a Fönstret slog-s sönder. Predicative
window.the hit-PASS broken
'The window was broken.'
b Tröjan smutsade-s ner. Non-Predicative
shirt.the dirtied-PASS down
'The shirt was made dirty.'

I set these aside, assuming that they should fall out from an analysis of the s-passive, which is problematic from many perspectives, not only for VPCs

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